DRAFT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL IMPACT STATEMENT

for the

UPPER GUADALUPE RIVER FLOOD CONTROL PROJECT

VOLUME I

Prepared by

SANTA CLARA VALLEY WATER DISTRICT
U.S. ARMY CORPS OF ENGINEERS

January 1997

DRAFT ENVIRONMENTAL IMPACT REPORT/STATEMENT
UPPER GUADALUPE RIVER FLOOD CONTROL PROJECT

San Jose, Santa Clara County, California

Pursuant to the California Environmental Quality Act
(Division 13, Public Resources Code) and
National Environmental Policy Act (40CFR 1500-1508 and 33 CFR 325, App.B)

Federal Regulatory Lead Agency:

U.S. Army Corps of Engineers
San Francisco District

State Regulatory Lead Agency:

Santa Clara Valley Water District
Environmental Resources Management Unit

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Abstract: The Santa Clara Valley Water District proposes to construct flood control facilities along the upper Guadalupe River to provide protection from the 100-year and smaller floods. The project area is currently an open channel urban stream. Portions of the project are subject to flooding on average every four years. The project area includes two distinct segments of the Guadalupe River, one from State Route 101 to Interstate 880 and another from Interstate 280 to Blossom Hill Road. Modifications are also proposed on adjacent portions of two tributaries, Ross and Canoas Creeks. Proposed facilities include bypass channels, channel widening and benching, gabion-linings, bridge construction, and floodwalls and levees. The main beneficial effect of the project is reduced flood hazard along the upper Guadalupe River. Mitigation measures proposed as part of the project would also contribute to long-term improvements in riparian habitat and reduction in the number and extent of vegetation gaps in the riparian corridor. The project's potential adverse impacts include short-term loss of riparian habitat, loss of housing, construction-related water quality, and fisheries impacts. The EIR/EIS also addresses a "No Action" or No Project Alternative and a Minimized Vegetation Impacts Alternative that would reduce instream impacts by providing a bypass channel in the middle reaches of the project area. The federal action is a Corps permit decision (Section 404, Clean Water Act; Section 10, Rivers and Harbors Act).

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CHAPTER 1

SUMMARY

CHAPTER 1

SUMMARY

1.1 PROJECT SUMMARY

The Guadalupe Flood Control Project is proposed by the Santa Clara Valley Water District to control flooding along the Guadalupe River within the City of San Jose. The River cannot currently contain the one-percent flood, or 100-year flood, which is defined as the flood which has, on the average, a one-percent chance of being equaled or exceeded in any given year. To increase the capacity of the River, channel modifications are proposed along eight sections, or reaches, of the River, covering about 6.4 miles. There are two discrete project segments, one from State Route (SR) 101 to Interstate 880 (I-880) and another from Interstate 280 (I-280) to Blossom Hill Road (Figure 1.1). Modifications are also proposed on adjacent portions of two tributaries, Ross and Canoas creeks. Modifications include bypass channels, channel widening and benching, gabion and cribwall lining, and construction of floodwalls and levees. The purpose and need for the project are discussed in Chapter 2.

During the project planning stages, a variety of alternatives were evaluated, including nonstructural alternatives, upstream storage alternatives, offstream storage alternatives, and various channel modification alternatives. The screening of alternatives is described in Chapter 3, which also presents a description of the alternatives selected for further study, including the Preferred Project. Various forms of channel modifications were further evaluated for each reach of the River. Three alternatives will be evaluated within this document: the Preferred Project, the Minimize Vegetation Impacts Alternative, and the No Project Alternative.

1.2 SUMMARY OF ALTERNATIVES

Alternatives Considered

During the project planning stages, a variety of alternatives were evaluated, including nonstructural alternatives, upstream storage alternatives, offstream storage alternatives, and various channel modification alternatives. Various forms of channel modifications were further evaluated for each reach of the Guadalupe River. Three alternatives are evaluated in the EIR/EIS: the Preferred Project, the Minimize Vegetation Impacts Alternative, and the No-Project Alternative.

Preferred Project Alternative

Implementation of the Preferred Project would achieve flood protection in the upper Guadalupe through channel widening, modifications of levees, and the construction of bypass channels. This project was developed by the District through the alternative evaluation process. The Preferred Project is described in the Project Summary, above. The Minimize Vegetation Impacts Alternative and the No-Project Alternative are discussed below. Table 1.1 compares the Preferred Project and the Minimize Vegetation Impacts Alternative.

Minimize Vegetation Impacts Alternative

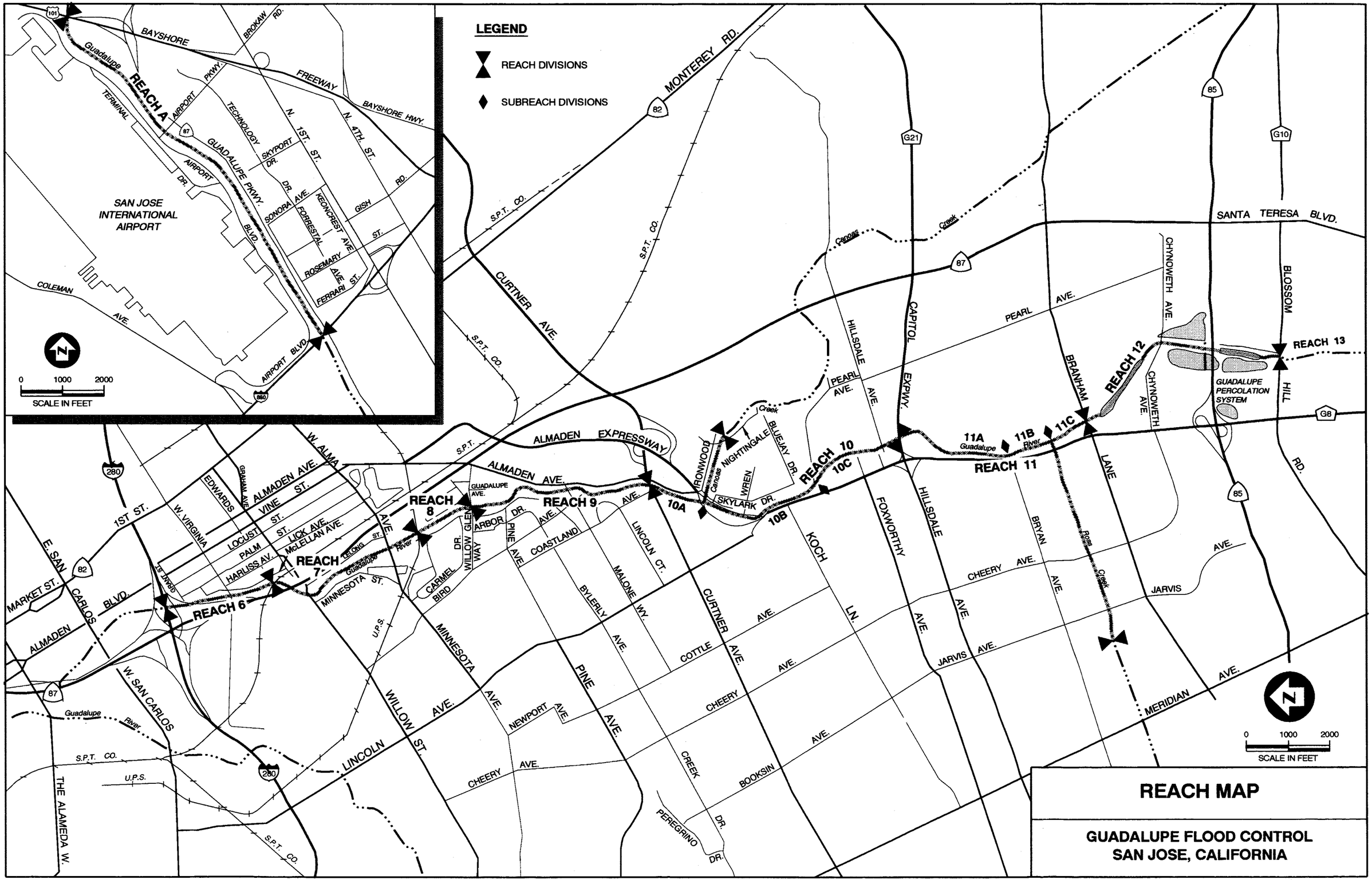
The Minimize Vegetation Impacts Alternative was developed to minimize impacts to the riparian corridor that would be associated with channel widening under the Preferred Project. Potential impacts to riparian habitat under the Preferred Project were determined to be greatest in reaches 9, 10A, 10C, 11A, and 12. The Minimize Vegetation Impacts Alternative includes channel modifications that would provide flood protection similar to the Preferred Project. The Minimize Vegetation Impacts Alternative is identical to the Preferred Project in reaches A, 6, 7, 8, 10B, 11B and 11C, and Ross Creek. The Minimize Vegetation Impacts Alternative differs from the Preferred Project in reaches 9, 10A, 10C, 11A, and 12. Under the Minimize Vegetation Impacts Alternative, an open earth bypass channel would be constructed in these reaches. Proposed channel modifications on Canoas Creek under the Minimize Vegetation Impacts Alternative would include an open bypass channel that would allow for a 1.5-foot high floodwall rather than the 3- to 4-foot high floodwall proposed under the Preferred Project.

In Reaches 9 and 10A, an earth bypass channel would be constructed west of the natural channel. Bridges would be constructed at Willow Glen Way, Malone Road, and Curtner Avenue to span the bypass channel. Construction of the bypass channel would require the removal of 65 structures in Reach 9 (mostly residential buildings on Creek Drive, Ardis Drive, and Coastland Avenue) and 18 structures in Reach 10A (mostly residential structures on El Rio Drive and Roy Court).

A bypass channel would be constructed east of and parallel to the Guadalupe River in the downstream portion of Reach 10C, from 150 feet downstream of Foxworthy Avenue. Construction of the bypass channel would not require removal of structures in this reach. Upstream of the bypass channel inlet, the east bank would be excavated to create a bench for a floodway and a revegetation area. The west bank would remain undisturbed. The Hillsdale Avenue Bridge would be removed and a bridge at Pearl Avenue would be constructed. Partial barriers to fish passage would be removed at the concrete weir downstream of Hillsdale Avenue and at Stream Gage No. 23B.

In Reach 11A, an earth bypass channel would be constructed east of the natural channel. Construction of the bypass channel would require the removal of 32 structures, mostly residential, located on Wellington Square.

FIGURE 1.1



REACH MAP

GUADALUPE FLOOD CONTROL
SAN JOSE, CALIFORNIA

REV. 1 C337-98.DWG 11/03/94

ENGINEERING-SCIENCE, INC.

TABLE 1.1

UPPER GUADALUPE RIVER
SUMMARY OF PROPOSED FLOOD CONTROL FACILITIES

		Main Flood Control Facility Proposed	
Reach	Limits	Preferred Project	Minimize Vegetation Impacts Alternative
A	Bayshore to I-880	Levees, floodwalls, and maintenance roads	Same as the Preferred Project
6	I-280 to SPRR	Gabion bypass channel	Same as the Preferred Project
7	SPRR to UPRR	Gabion bypass channel	Same as the Preferred Project
8	UPRR to Willow Glen Way	Gabion bypass channel	Same as the Preferred Project
9	Willow Glen Way to Curtner Avenue	Selective widening and cribwall lining	Earth bypass channel west of the natural channel
10A	Curtner Avenue to Southbound Almaden Expressway	Widened cribwall channel	Earth bypass channel west of the natural channel
10B	Southbound Almaden Expressway to Gaging Station 23B	Levee, floodwall, and low-flow channel	Same as the Preferred Project
10C	Gaging Station 23B to Capitol Expressway	Widened gabion channel and low-flow channel	Earth bypass channel east of the natural channel and channel widening
11A	Capitol Expressway to Bryan Avenue	The downstream section would be a 700-foot open bypass channel. Upstream the east bank would be widened to create a gabion channel.	Earth bypass channel east of the nature channel
11B	Bryan Avenue to Ross Creek	West bank widening with gabions and cribwalls	Same as the Preferred Project
11C	Ross Creek to Branham Lane	West bank widening with cribwalls	Same as the Preferred Project
12	Branham Lane to Blossom Hill Road	Levee and revegetation area	Earth bypass channel west of the natural channel and channel widening
13	Blossom Hill Road to about 1,500 feet upstream	Construct a stepped pool fish passage over 15-foot structure	Same as the Preferred Project
Canoas Creek	Guadalupe River to end of Nightingale Drive	3-foot to 4-foot high floodwalls	1.5-foot high earth bypass channel and floodwall
Ross Creek	Guadalupe River to Jarvis Avenue	Widened channel with articulated mat lining and culverts	Same as the Preferred Project
Guadalupe River Alamitos Creek Guadalupe Creek	(Reaches 10 and 11)	Fish barrier modifications, as mitigation for project impacts	Same as the Preferred Project

In Reach 12 an earth bypass channel would be constructed west of the natural channel from Branham Lane to the future Chynoweth Avenue Bridge. No structures would be removed as a result of bypass construction within this reach. Channel widening is proposed from the future Chynoweth Avenue Bridge to Blossom Hill. Operation of the Branham and Blossom Hill seasonal dams would be discontinued and the in-stream percolation pond would be replaced with off-stream ponds.

No Project Alternative

The No Project Alternative is evaluated as required by CEQA and NEPA. The No Project Alternative would not fulfill the project objective of protection for the 100-year flood event.

Long-term benefits resulting from the proposed mitigation plan, such as a net gain of riparian forest and possibly wetland area, reduction in gaps in the riparian corridor, and reduction of non-native plants in the riparian forest, would not occur under the No Project Alternative

1.3 SUMMARY OF IMPACTS AND MITIGATION MEASURES

Table 1.2 summarizes significant adverse impacts of the Preferred Project and the other two alternatives that are evaluated in this EIR/EIS: the Minimize Vegetation Impacts Alternative and the No Project Alternative. A complete description of the affected environment and the environmental consequences of the Preferred Project, the Minimize Vegetation Impacts Alternative, and the No Project Alternative is contained in Chapter 4. Potential beneficial impacts and impacts that were determined to be less-than-significant are also discussed in each topic section, but are not included in Table 1.2.

The main beneficial impacts of the project are from reduced flood hazards, including protecting land and structures from inundation during major storm and flood events and alleviating the risk of loss of life during flooding. The project would also result in beneficial impacts to biotic resources by removing instream structures that currently create a barrier to fish. Proposed mitigation planting could result in improved riparian plant and animal habitat which could enhance riparian habitat in the Guadalupe River corridor.

Significant impacts that were identified in each environmental topic section in Chapter 4 have been assigned numbers. For example, erosion during construction was identified as a potential geology, soils, and seismicity impact and is numbered "Impact G-1." The mitigation measure recommended to reduce this impact to a less-than-significant level is numbered "Mitigation Measure G-1." In some cases, more than one impact can be mitigated by a single mitigation measure, as indicated in the summary table. Similarly, more than one mitigation measure may be recommended for a single impact. When this occurs, the numbered mitigation measures are followed by a, b, c, etc. Table 1.2 contains one-sentence impact and mitigation measure statements that are followed, in parentheses, by a page number where that impact or mitigation measure is discussed in the main EIR/EIS text in Chapter 4.

Table 1.2 also contains a summary of significant cumulative impacts of the Preferred Project. Significant cumulative impacts were identified for vegetation and fishery resources and mitigation measures recommended.

TABLE 1.2

SUMMARY OF POTENTIAL SIGNIFICANT IMPACTS AND RECOMMENDED MITIGATION MEASURES

IMPACTS	MITIGATION MEASURES
PROJECT IMPACTS	
GEOLOGY, SOILS, AND SEISMICITY	
Preferred Project	
G-1. Ground Movement During Shoring. (page 4.1-11)	G-1. Install Sufficient Support and Bracing During Shoring. (page 4.1-12)
G-2. Soil Densification Due to Pile Driving. (page 4.1-11)	G-2. Use a Backhoe to Drive Piles Where Vibration Could Result in Ground Settlement. (page 4.1-12)
G-3. Slope Instability. (page 4.1-12)	G-3. Limit Unsupported Slopes to 2:1 and Anchor Gabions/Cribwalls unless Determined Otherwise in a Geotechnical Report. (page 4.1-12)
G-4. Seismically-induced Slope Failure or Ground Failure. (page 4.1-12)	G-4. Comply with the Uniform Building Code Seismic Resistance Specifications. (page 4.1-13)
Minimize Vegetation Impacts Alternative	
Impacts would be similar to those for the Preferred Project except that more excavation would be required in Reaches 9 through 12.	Mitigation measures recommended for the Preferred Project should be incorporated into this alternative.
No Project Alternative	
Existing erosion and slope instability would continue.	Ongoing maintenance, including bank stabilization would be performed.
SURFACE AND GROUNDWATER HYDROLOGY	
Preferred Project	
No significant impacts would result from the Preferred Project.	No mitigation is needed.
Minimize Vegetation Impacts Alternative	
Surface water impacts would be similar to those for the Preferred Project. This alternative would result in the loss of approximately 14 acres of groundwater recharge area as a result of the removal of in-stream percolation ponds.	The District should evaluate water supply needs and consider compensating for the loss of recharge area by creating additional off-stream or groundwater injection recharge capacity.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
No Project Alternative	
Existing potential for serious flood damage from one-percent flood would remain unchanged.	Without implementation of flood control measures, the only possible mitigation to avoid flood damage would be to floodproof or remove structures from the 100-year floodplain.
WATER QUALITY	
Preferred Project	
WQ-1. Construction-Related Erosion and Sedimentation. (page 4.3-5)	WQ-1. Prepare and Implement a Storm Water Pollution Prevention Plan. (page 4.3-6)
Minimize Vegetation Impacts Alternative	
Construction of an earth bypass channel in Reaches 9, 10A, 10C, 11A, and 12 could reduce construction-related sedimentation. However, excavation would occur further from river, involve more developed properties, and could encounter hazardous wastes.	Mitigation measures recommended for the Preferred Project should be incorporated into this alternative.
No Project Alternative	
Existing erosion and operation of temporary gravel dams would continue with the No Project Alternative.	Routine maintenance would continue.
HAZARDOUS MATERIALS	
Preferred Project	
HM-1. Construction Activities Could Result in Exposure of Soils or Groundwater that Contain Hazardous Materials. (page 4.4-14)	HM-1. Conduct Site Investigations and Remediation and Waste Disposal in Accordance with Applicable Laws and Regulations. (page 4.4-16)
HM-2. The Proposed Project Could Affect the Investigative and/or Remedial Activities Conducted at Contaminated Sites Reported Within the Project Area. (page 4.4-15)	HM-2. Monitor Groundwater Gradients and Migration of Contaminant Plumes at Contaminated Sites in the Vicinity of the Project Site as Necessary to Determine if Project Construction Has Adversely Affected Site Characterization and/or Remediation Activities. (page 4.4-17)
HM-3. Building Demolition Could Encounter and Release Asbestos. (page 4.4-16)	HM-3. Conduct Asbestos Inspections and Removals. (page 4.4-17)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Minimize Vegetation Impacts Alternative	
Impacts could be similar to or slightly greater than those for the Preferred Project due to increased excavation for the bypass channel and maintenance road.	Mitigation would be similar to the Preferred Project.
No Project Alternative	
Under the No Project Alternative, existing residential uses adjacent to the River would remain. Unauthorized disposal of refuse and household hazardous materials by residents would continue.	The District should implement a community education program to discourage residents from disposing of wastes in the river.
LAND USE AND GENERAL PLAN CONSIDERATIONS	
Preferred Project	
LU-1. Construction-related Nuisance Impacts to Local Residents. (page 4.5-9)	LU-1. Implement Air Quality, Noise, Traffic, and Public Safety Measures to Mitigate Short-term Construction Impacts. (page 4.5-11)
LU-2. Impacts of Interim Use of Properties Prior to Open Space Conversion. (4.5-10)	LU-2. Implement Property Management Plan to Maintain Rental Housing in the Community and Create Attractive Viable Uses for Vacant Properties. (page 4.5-11).
LU-3. Conversion of Residential Land Uses to Open Space. (page 4.5-10)	LU-3. Coordinate with Affected Residents to Reduce Impact of Abrupt Changes to Neighborhoods. (page 4.5-12). Refer also to Mitigation Measure S-1.
Minimize Vegetation Impacts Alternative	
Bypass construction in Reaches 9 and 10A would have greater short-term and long-term land use impacts than the Preferred Project. 115 additional structures would be removed. Recreational value would be less affected by retaining riparian vegetation, but access would be less under this alternative.	Mitigation would be the same as for the Preferred Project.
No Project Alternative	
There would be no new land use impacts, but development would continue to be subject to floodplain management criteria.	No mitigation is needed.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
SOCIOECONOMICS	
Preferred Project	
S-1. Direct Impacts on Housing Stock and Businesses. (page 4.6-4)	S-1. Provide Housing and Business Displacement Assistance. (page 4.6-5)
Minimize Vegetation Impacts Alternative	
116 residential structures would be displaced, compared to Preferred Project.	Mitigation would be the same as for the Preferred Project.
No Project Alternative	
There would be no impacts associated with the No Project Alternative.	No mitigation is needed.
TRAFFIC	
Preferred Project	
T-1. Construction Traffic Impacts Related to Bridge and Culvert Construction. (page 4.7-8)	T-1. Establish Traffic Detours to Minimize the Disruption of Traffic Caused by Construction. (page 4.7-13)
T-2. Traffic on Almaden Expressway Would Be Affected During Construction. (page 4.7-12)	T-2. Minimize Disruption to Almaden Expressway by Specific Construction Scheduling Procedures. (page 4.7-14)
T-3. During Construction, Transit Lines Would Be Rerouted, Which Would Affect Scheduling. (page 4.7-12)	T-3. Notify County Transit of Bridge Closures and Need for Rerouting. (page 4.7-14)
T-4. Pedestrian and Bicycle Use Would Be Temporarily Affected By Bridge Construction. (page 4.7-12)	T-4. Establish Temporary Alternative Pedestrian and Bicycle Access. (page 4.7-14)
T-5. Truck Traffic Would Increase During Construction. (page 4.7-12)	T-5. Minimize Traffic Disruption That Contractor Vehicles and Haul Trucks Could Cause During Construction by Establishing Haul Routes and Other Measures. (page 4.7-14)
T-6. SPRR and UPRR Operations Could Be Affected by Installation of Reinforced Concrete Box Culverts in Reach 7. (page 4.7-12)	T-6. The District's Contractor Should Comply with all Railroad Company Regulations and Instructions Governing Railroad Operations and Property. (page 4.7-15)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Minimize Vegetation Impacts Alternative	
The MVI Alternative would be associated with construction traffic impacts related to bridge construction, similar to those identified in Impact T-1 for the Preferred Project.	Mitigation measure T-1 should be incorporated into the MVI Alternative to reduce potential traffic impacts in Reach A and Reaches 6 through 8.
No Project Alternative	
There would be no long-term, operational traffic impacts. Existing potential for road closure and serious traffic delays as a result of flooding would remain unchanged.	No mitigation is needed.
NOISE	
Preferred Project	
N-1. Temporarily increased noise levels. (page 4.8-11)	N-1. Equip Construction Equipment With Standard Noise Control Devices and Implement Other Noise Control Measures as Necessary to Comply with the Local Plans or Development Permit Requirements. (page 4.8-15)
Minimize Vegetation Impacts Alternative	
Construction of an earth bypass channel near the existing channel in Reaches 9, 10A, and 11 would result in short-term construction-related noise impacts that would not occur with the Preferred Project.	Mitigation would be similar to the Preferred Project.
No Project Alternative	
No impact would result from the No Project Alternative.	No mitigation is needed.
AIR QUALITY	
Preferred Project	
A-1. Dust and exhaust emissions. (page 4.9-5)	A-1. Control Emissions During Construction. (page 4.9-6)
Minimize Vegetation Impacts Alternative	
Impacts are slightly greater than the Preferred Project due to increased excavation, earth moving, and demolition activities in Reaches 9-12, as a result of bypass channel construction.	Mitigation would be similar to the Preferred Project.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
No Project Alternative	
No impacts would result from the No Project Alternative.	No mitigation is needed.
PUBLIC SERVICE & UTILITIES	
Preferred Project	
PSU-1. Possible Impediments to Police and Fire Protection Services. (page 4.10-3)	PSU-1 Notify Police and Fire Protection Services Regarding Construction. (page 4.10-4)
PSU-2. Potential Disruption to Wells. (page 4.10-4)	PSU-2. Relocate Wells Before Construction. (page 4.10-4)
PSU-3. Relocation of Utilities. (page 4.10-4)	PSU-3. Coordinate Relocation of Utilities. (page 4.10-4)
Minimize Vegetation Impacts Alternative	
Impacts related to public services and utilities identified for the Preferred Project would be similar under the Minimized Vegetation Impacts Alternative. Additional units may require relocation along the proposed bypass corridor in reaches 9, 10A, 11, and 12.	Mitigation would be similar to the Preferred Project.
No Project Alternative	
Under the No Project Alternative, emergency services would continued to be required during flooding to protect public safety, control roadways, and participate in cleanup efforts.	No mitigation is needed.
PUBLIC SAFETY	
Preferred Project	
PS-1. Potential Public Safety Impacts Due to Access and Unauthorized Entry to the Vacant Structures and Construction Areas. (page 4.11-1)	PS-1. Provide Warning Signs and Install Fencing and Barricades at Construction and Demolition Sites. (page 4.11-2)
PS-2. Roadway and Bridge Construction Hazards to Vehicles and Pedestrians. (page 4.11-1)	PS-2a. Identify Truck Routes and Construction Zones Prior to Project Commencement. (page 4.11-2)
	PS-2b. Notify Residents of Construction Schedules and Proposed Traffic Detours. (page 4.11-2)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
PS-3. Potential Public Safety Impacts Due to Long-term Security and Access Control Along and Adjacent to the River. (page 4.11-2)	PS-3. Limit Public Access to the River Channel by Installing Fencing and Posting Signs. (page 4.11-2)
Minimize Vegetation Impacts Alternative	
Impacts would be similar to those identified for the Preferred Project. However, impact would be slightly greater in Reaches 9, 10A, 11 and 12 where an additional bypass channel would be constructed.	Mitigation measures would be similar to the Preferred Project.
No Project Alternative	
No construction impacts would result from the No Project Alternative. Existing potential for damage and losses of residences and businesses from flooding would remain unchanged.	No mitigation is needed for construction hazards. Operational measures would be the same as for the Preferred Project.
VEGETATION	
Preferred Project	
V-1. Removal of Vegetation Including 9.48 Acres of Riparian Forest, 5.23 Acres of Urban Forest, 1.85 Acres of Jurisdictional Wetlands, 10.16 Acres of Other Waters of the U.S., and 250 to 300 Ordinance Trees. (page 4.12-25)	V-1. Prepare and Implement an Integrated Vegetation Mitigation Plan. (page 4.12-27)
V-2. Disturbance of Riparian Forest Adjacent to Construction Areas. (page 4.12-26)	V-2. Implement a Vegetation Protection Plan for Riparian and Urban Forests. (page 4.12-34) Refer to Mitigation Measure V-1 above.
V-3. Disturbance of Riparian Forest Associated with Erosion Repair Activities (about 0.78 acres). (page 4.12-27)	V-3. Revegetate Erosion Repair Sites with Riparian Vegetation. (page 4.12-35)
Minimize Vegetation Impacts Alternative	
Implementing the project would require removal of 5.21 acres of riparian forest.	Refer to Mitigation Measure V-1.
Implementing the project would require removal of 250-300 trees that may qualify for protection under the City's tree ordinance.	Refer to Mitigation Measures V-1.
Implementing the project could result in substantial disturbance to riparian forest plants outside but adjacent to construction areas.	Refer to Mitigation Measures V-1. and V-2.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Implementing the project would require removal of 7.27 acres of urban forest.	Refer to Mitigation Measures V-1.
Implementing the project would result in loss or disturbance of 1.75 acres of wetlands and 7.64 acres of other waters of the United States.	Refer to Mitigation Measure V-1.
No Project Alternative	
No construction impacts on vegetation would occur under the No-Project Alternative; however, long-term benefits resulting from the proposed mitigation plan (a net gain of riparian forest and possibly wetland acreages and reduction of non-native plants in the riparian forest) would also not occur. Existing and ongoing operations and maintenance and erosion control practices that are described under "Operational Impacts" would continue.	No mitigation is needed.
WILDLIFE	
Preferred Project	
WL-1. Removal of Riparian Wildlife Habitat. (page 4.13-20)	WL-1. Refer to Mitigation Measures V-1 and V-2. (page 4.13-22)
WL-2. Fragmentation of Wildlife Habitat Along the Riparian Corridor. (page 4.13-21)	WL-2. Refer to Mitigation Measures V-1 and V-2. (page 4.13-23)
WL-3. Disturbance of Riparian Wildlife Habitat Adjacent to Construction Areas. (page 4.13-21)	WL-3. Refer to Mitigation Measure V-3. (page 4.13-23)
WL-4. Removal of Urban Forest Wildlife Habitat. (page 4.13-21)	WL-4. Refer to Mitigation Measures V-1, V-2, and V-3. (page 4.13-23)
WL-5. Removal of Wetland and Aquatic Wildlife Habitats. (page 4.13-21)	WL-5. Refer to Mitigation Measure V-1. (page 4.13-23)
WL-6. Construction Disturbance to Wildlife Species along the Guadalupe River. (page 4.13-22)	WL-6. Refer to Mitigation Measure V-3. (page 4.13-23)
WL-7. Loss of Yellow Warbler Breeding Habitat. (page 4.13-22)	WL-7. Refer to Mitigation Measures V-1 and V-2. (page 4.13-23)
WL-8. Potential Disturbance to Breeding Burrowing Owls. (page 4.13-22)	WL-8. Conduct Burrowing Owl Survey and Avoid Adverse Impacts on Burrowing Owls if Present. (page 4.13-23)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
WL-9. Loss of Suitable San Francisco Forktail Damselfly Habitat. (page 4.13-22)	WL-9. Refer to Mitigation Measure V-1. (page 4.13-24)
Minimize Vegetation Impacts Alternative	
Impacts to wildlife would be similar to those for the Preferred Project, but they would affect smaller acreages in Reaches 9-10A and Reaches 10C-11A. Substantially less yellow warbler breeding habitat would be removed in Reaches 9-10A and 10C-11A. Potential disturbance to breeding burrowing owls would be the same in Reaches A and 12. Substantially less fragmentation of riparian forest would occur. Loss or disturbance of wildlife habitat that can be quantified by acreage are listed in Table 4.13-2 on page 4.13-19.	Mitigation measures and replacement ratios for all impacts on wildlife would be the same as those for the Preferred Project.
No Project Alternative	
No construction impacts on wildlife would occur under the No-Project Alternative; however, long-term benefits resulting from the mitigation plan (a net gain of riparian forest and reduction of non-native plants in the riparian forest) would not occur. Existing and ongoing operations and maintenance and erosion control practices that are described in the "Vegetation" section under "Operational Impacts" would continue.	No mitigation is needed.
FISHERIES	
Preferred Project	
F-1. Reduction in Shaded Riverine Aquatic (SRA) Cover Resulting from the Removal of 5,096 Linear Feet of Overwater Vegetation and 1,720 Linear Feet of Undercut Bank along the Guadalupe River. (page 4.14-39)	F-1. Construct Undercut Banks On Site, Replace SRA, and Improve Fish Passage Conditions on Guadalupe Creek. (page 4.14-41)
Minimize Vegetation Impacts Alternative	
Most impacts would be similar to those of the Preferred Project. Potential for sedimentation and turbidity and reduced in-stream cover and shade associated with periodic vegetation removal and disturbance for floodway maintenance would be reduced by construction of a bypass channel in Reaches 9-10A and 10C-11.	Mitigation are the same as those for similar impacts above.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Construction activities would result in the loss of 110 linear feet of undercut streambank and about 0.4 acre and 2,010 linear feet of overwater vegetation.	Mitigation Measures F-2 and V-1 would be implemented with a smaller level of habitat development in proportion to the smaller level of impact.
No Project Alternative	
Construction of project facilities would not occur and existing fishery resources would be maintained. The partial barriers downstream of the project area would not be modified or removed. Adverse and beneficial impacts on fisheries associated with the project would not occur.	No mitigation is needed.
VISUAL/AESTHETIC RESOURCES	
Preferred Project	
V/A-1. Reduced Visual Quality from Construction-Related Activities. (page 4.15-71)	V/A-1a. Locate Staging and Storage Areas Outside Visually Sensitive Areas. (page 4.15-85)
	V/A-1b. Minimize Areas of Surface Disturbance by Minimizing Clearing and Grading. (page 4.15-85)
	V/A-1c. Restore Graded Areas to Original Contours and Revegetate Cleared Areas. (page 4.15-85)
V/A-2. Removing or Substantially Reducing Views of Important Vegetation. (page 4.15-71)	V/A-2. Reestablish Views of Vegetation of High Visual Interest or Aesthetic Value. (page 4.15-85)
V/A-3. Increased Visibility or Viewer Awareness of Visually or Aesthetically Incongruous Elements from Removing or Reducing Screening Vegetation. (page 4.15-71)	V/A-3. Screen Views of Visually Incongruous Elements Resulting from Project Implementation. (page 4.15-86)
V/A-4. Degradation of the Natural-Appearing Character of the River Corridor. (page 4.15-84)	V/A-4. Maintain the Natural Character of the River Corridor. (page 4.15-86) Refer to Mitigation Measures V/A-2 and V/A-3 above and V/A-5 below.
V/A-5. Reduced Visual Quality by Removing or Replacing Structural Elements or Introducing Visually Incongruous Structures and Engineered Improvements. (page 4.15-84)	V/A-5. Blend New or Altered Structures with Their Surroundings. (page 4.15-88)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Minimize Vegetation Impacts Alternative	
Visual impacts would be similar to those for the Preferred Project, but they would affect fewer visually sensitive areas (refer to page 4.15-41 for definition) in Reaches 9-10A and 11A. Visual impacts in Reach 10B would be greater under this alternative.	Mitigation measures are the same as those recommended for the Preferred Project.
No Project Alternative	
Construction-related impacts on visual resources would not occur. Cleanup of substantial amounts of concrete rubble and commercial and household debris in the project area would not be conducted, and the District would continue to have limited access and easements to the stream. No new structures or views would be introduced, and no existing structures or views would be removed. Effects on visual resources from operation and maintenance procedures would not change.	No mitigation is needed.
HISTORIC AND ARCHAEOLOGICAL RESOURCES	
Preferred Project	
AH-1. Excavation Within the Project Area Could Disrupt or Destroy Archaeological Resources. (page 4.16-6)	AH-1. Monitor Construction Activities to Identify Archaeological Resources. (page 4.16-7)
AH-2. Project Construction Would Result in Removal or Disturbance to Structures with Historical Significance. (page 4.16-7)	AH-2. Preserve Historical Resources Where Possible; Document and Salvage Significant Elements Where Structural Demolition is Necessary. (page 4.16-8)
Minimize Vegetation Impacts Alternative	
Impacts to historic structures could be greater than for the Preferred Project, because 115 additional structures would be displaced as a result of this alternative.	Mitigation would be similar to those for the Preferred Project.
No Project Alternative	
No adverse impacts would result from the No Project Alternative.	No mitigation is needed.

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
CUMULATIVE IMPACTS	
VEGETATION	
Preferred Project	
Cv-1. Direct Removal of Riparian Vegetation and Near-Term Reduction in Mature Riparian Vegetation. (page 5-13)	Cv-1a. Minimize Recreational Impacts on Riparian Vegetation. (page 5-13) Cv-1b. Implement Revegetation during the First Fall Planting Season after Reach Construction. (page 5-15)
Minimize Vegetation Impacts Alternative	
Potential cumulative impacts resulting from the Minimize Vegetation Impacts Alternative would be less than those for the Preferred Project because less instream vegetation removal would be required in reaches 9, 10A, and 11A. The Minimize Vegetation Impacts Alternative would contribute to the short-term cumulative reduction of mature riparian vegetation (removing about 5 acres of riparian habitat), about 4.3 acres less than the Preferred Project. No long-term cumulative vegetation impacts would result from the Minimize Vegetation Impacts Alternative.	
No Project Alternative	
The No Project Alternative would not result in cumulative impacts to mature riparian vegetation.	
FISHERIES	
Preferred Project	
Cf-1. Construction of the Preferred Project and Other Projects on the Guadalupe River Would Result in Cumulative Impacts to Anadromous Fish Habitat, Water Temperature, and Potential Sedimentation of Spawning and Food Producing Areas. (page 5-16)	Cf-1. Provide for Fish Passage on Alamitos Creek and Monitor for the Presence of Native Fish. (page 5-19)

TABLE 1.2 (continued)

IMPACTS	MITIGATION MEASURES
Minimize Vegetation Impacts Alternative The project's contribution to cumulative fishery impacts under the Minimize Vegetation Impacts Alternative would be somewhat less than those described for the Preferred Project. Reduced fishery impacts would result from reduced instream construction activities. **No Project Alternative** The No Project Alternative would not result in cumulative impacts to anadromous fish habitat.	

1.4 SUMMARY OF PRE-PROJECT AND POST-PROJECT BIOTIC CONDITIONS

Pre-Project Conditions

The project area contains a mosaic of habitats, ranging from dense, mature cottonwood forest to open herbaceous vegetation along disturbed channels. In a few sections of the project area, mature, multiple-layer riparian plant communities are present, dominated by combinations of cottonwood, willow, sycamore, box elder, walnut, and other trees. Most of the riparian corridor along the Guadalupe River is narrow and discontinuous, and it is constrained by adjacent urban land uses. Vegetation throughout the project area is degraded.

The lands surrounding the river have been developed into residential, commercial, and light industrial areas. Numerous roads (including two highways and an expressway) and two railways cross the river in the project area, creating breaks in the riparian corridor and limiting some wildlife movement (especially that of terrestrial species such as mammals, reptiles, and some amphibians) along the river. Past bank stabilization actions have created additional gaps in the riparian corridor. The extent of riparian vegetation growing on the banks of the river is limited by buildings, roadways, and other facilities situated at or near the top of the banks, and by previous bank stabilization and flood control activities. The relative lack of natural or rural areas adjacent to the riparian corridor and its narrow width may limit its attractiveness to wildlife, and species with large home range requirements may be absent.

Despite its narrow, fragmented character and urban setting, the Guadalupe River is an important area for wildlife in the Santa Clara Valley because it provides an important refuge for wildlife in an urban environment; it supports species, such as yellow warblers, that do not occur in adjacent habitats; it provides a corridor (connecting San Francisco Bay, the valley floor, and foothill habitats) for movement of wildlife, such as small mammals, amphibians, and resident birds; it functions as a linear reserve, adding to the total amount of suitable habitat in the local environment; and it makes an important contribution to maintaining a wide range of wildlife species in adjacent habitats, including urban areas (Bennett pers. comm.).

Despite urban land uses adjacent to the channel, the Guadalupe River provides important habitat for spawning and rearing of chinook salmon and steelhead trout. The presence of adult chinook salmon was most recently documented in the Guadalupe River by the District in 1995-1996 and in October 1996.

Post-Project Conditions

Table 1.3 below illustrates the net change with project implementation and mitigation for several habitat types. Successful implementation of mitigation measures to compensate for removal of vegetation and loss of shaded riverine aquatic (SRA) habitat would result in no net loss of overwater vegetation and would provide for more continuous shading over the entire project area. These measures would also provide a net long-term increase in habitat quality and a more continuous riparian corridor along the Guadalupe River because all of the riparian forest removed during construction (much of which is dominated by non-native and

TABLE 1.3

NET CHANGE IN HABITAT TYPES

Habitat Type	Pre-Project	Post-Project	Net Change
Riparian forest (acres)	47.48	62.39	+14.91
Urban forest (acres)	9.45	9.50	0.05
Jurisdictional wetland (acres)	8.75	9.32	+0.57
Other waters of the U.S. (acres)	36.62	36.62	0
Overwater vegetation (linear feet)	17,948	22,980	5,032
Undercut bank (linear feet)	11,110	11,110	0
Total length of gaps between riparian forest patches	34,530	21,250	-13,280
Barriers to fish passage in project from I-280 to Upper Watershed	8	0	-8

weedy plants) would be replaced with native species and a net gain of riparian forest would result (see table below). Proposed mitigation would also result in a net increase in wetland acreage. Mitigation measures requiring the District to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project would increase the likelihood of successful mitigation efforts for all resources.

Channel improvements with proposed fish passage structures would improve fish migration opportunities in lower Ross Creek relative to existing passage conditions. Channel improvements would reduce the potential for fish migration into Canoas Creek, which provides unsuitable habitat for salmonid production. Removing partial fish barriers would increase habitat availability for migrating steelhead trout and chinook salmon.

Implementation of the project would permit construction of the City's park recreation plan, which includes six miles of future park and trail development along the upper Guadalupe River corridor. Proposed recreational facilities would connect Alamitos Creek to Downtown San Jose.

Mitigation measures for cumulative impacts on fisheries require the District to install fish passageways on its drop structure upstream of Blossom Hill Road and provide for fish passage at Masson Dam on Guadalupe Creek and the gabion structure on Alamitos Creek upstream of Mazzone Drive. Implementing all required mitigation measures and incorporating the environmental protection measures would result in approximately 18 miles of more suitable upstream spawning and rearing habitat for anadromous fish, resulting in a significant, long-term beneficial impact on fishery resources.

1.5 COMPARISON OF ALTERNATIVES

Preferred Project and Minimize Vegetation Impacts Alternative

The Minimize Vegetation Impacts Alternative would have impacts similar to the Preferred Project in Reaches A, 6, 7, 8, 10B, 11B, 11C, and Ross Creek. However, construction of an earth bypass channel in Reaches 9, 10A, 11C, and 12 would result in substantial socioeconomic impacts, in that 115 additional structures would be removed by the Minimize Vegetation Impacts Alternative. However, socioeconomic impacts can be mitigated to a level of insignificance for either alternative through implementation of the District's Relocation Assistance Plan.

Impacts of the Minimize Vegetation Impacts Alternative on vegetation and wildlife resources would be substantially less than for the Preferred Project. Substantially less yellow warbler breeding habitat would be affected and less fragmentation of riparian forest would occur. Under the Minimize Vegetation Impacts Alternative, impacts on fisheries would be less than for the Preferred Project because less vegetation would be removed from the stream banks, thus preserving in-stream cover and reducing sedimentation and turbidity. Levels of significance, mitigation measures, and replacement ratios would be the same for impacts on vegetation and wildlife under the Minimize Vegetation Impacts Alternative and the Preferred Project.

Preferred Project and No Project Alternative

The No Project Alternative would avoid all of the short-term construction impacts associated with both the Preferred Project and Minimize Vegetation Impacts Alternative. However, flooding would continue to affect the project area and existing water quality impacts associated with erosion of banks would continue. Neither the Preferred Project nor the Minimize Vegetation Impacts Alternative has unmitigable, significant, long-term impacts in the areas of geology, soils, seismicity, hydrology, water quality, hazardous materials, land use and general plan considerations, traffic, noise, air quality, public services and utilities, public safety, or historic and archaeological resources. The No Project Alternative thus does not offer any advantages in these areas.

The greatest potential for significant impacts from the Preferred Project is in the area of biotic resources and aesthetics. No construction impacts on vegetation or wildlife habitat would occur under the No Project Alternative; however, long-term benefits resulting from the mitigation plan (a net gain of riparian forest and possibly wetland acreages and reduction of non-native plants in the riparian forest) would not occur. If the No Project Alternative were implemented, construction of project facilities would not occur and existing fishery resources would be maintained. Adverse and beneficial impacts on fisheries associated with the project would not occur.

Under the No Project Alternative, construction-related impacts on visual resources would not occur. No new views would be introduced, and no existing vegetation or structures would be removed. Effects on visual resources from operation and maintenance procedures would probably not change.

Environmentally Superior Alternative

In accordance with CEQA requirements, an environmentally superior alternative, the Minimize Vegetation Impacts Alternative, is identified in the EIR. Table 1.4 compares alternatives. The Minimize Vegetation Impacts Alternative would be associated with fewer impacts to riparian vegetation and would result in fewer impacts to fish and wildlife that depend on the unusual aquatic and riparian habitat along the Guadalupe River Corridor.

The Minimize Vegetation Impacts Alternative would be associated with significantly greater socioeconomic impacts that would result from increased loss of housing in the Bypass channel alignment. However, social and economic effects are not considered to be environmental impacts under CEQA.

The Minimize Vegetation Impacts Alternative would be associated with slightly increased construction-related noise, air quality, and traffic; however, these impacts would be temporary and are not considered to be significant. Therefore, the Minimize Vegetation Impacts Alternative is considered to be the environmentally superior alternative.

1.6 AREAS OF CONTROVERSY AND ISSUES TO BE RESOLVED

Three public meetings were held in various locations along the Guadalupe River to identify issues of public concern. Meetings were held on 7 March, 13 March, and 29 March 1989. Subsequent public meetings were held in April 1990 and May 1995. Several major issues were identified at these meetings. A number of residents expressed concerns about housing relocation impacts and policies for compensation and assistance during relocation. Several homeowners expressed concern about the effects of removing trees along the River. In particular, there were questions about potential noise increases after removing existing vegetation along the River. Several residents felt that existing trees protect them from noise from the adjacent Almaden Expressway, and feared that traffic noise levels at their property would increase if trees were removed. These issues are addressed in this EIR/EIS.

An agency scoping meeting was held on 13 February 1990. This meeting was attended by representatives of the City of San Jose, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (DFG). An all day workshop with the resource agencies was held in December 1994. The primary concerns expressed by the resource agencies pertain to project impacts on riparian habitat, fisheries, and water quality. These issues are evaluated in this EIR/EIS. The City's primary concern was the compatibility of the project with the proposed Guadalupe River Park South Master Plan. The Preferred Project would complement the park plan. Chapter 9.2 of this EIR/EIS provides a summary of agency and public involvement and includes a list of issues identified and the resulting effect on project design and alternative consideration.

TABLE 1.4

COMPARISON OF ALTERNATIVES

Impact Area	Preferred Project	Minimize Vegetation Impacts Alternative Compared to the Preferred Project	No Project Alternative Compared to the Preferred Project
Geology, Soils, and Seismicity	O	=	-
Hydrology	*	+	●
Water Quality	O	<	-
Hazardous Materials	O	=	=
Land Use and General Plan Considerations	O	+	-
Socioeconomics	O	+	-
Traffic	O	+(T)	-
Noise	O	+(T)	-
Air Quality	O	+(T)	-
Public Services and Utilities	O	=	+(T)
Public Safety	O	=	+(T)
Vegetation	O	<	-
Wildlife	O	<	-
Fisheries	O	<	-
Visual/Aesthetic Resources	O	=	-
Historic and Archeological Resources	O	+	-
Cumulative	O	=	-

* Overall beneficial impacts
● Significant unavoidable impact
O Significant impacts that can be mitigated
< Fewer impacts than the Preferred Project
\+ Greater significant impacts than the Preferred Project, but can be mitigated; (T) indicates temporary impact
= Impacts would be similar to the Preferred Project
\- No impacts

CHAPTER 2

PURPOSE AND NEED FOR THE PROJECT

CHAPTER 2

PURPOSE AND NEED FOR THE PROJECT

2.1 LOCATION AND GENERAL PROJECT DESCRIPTION

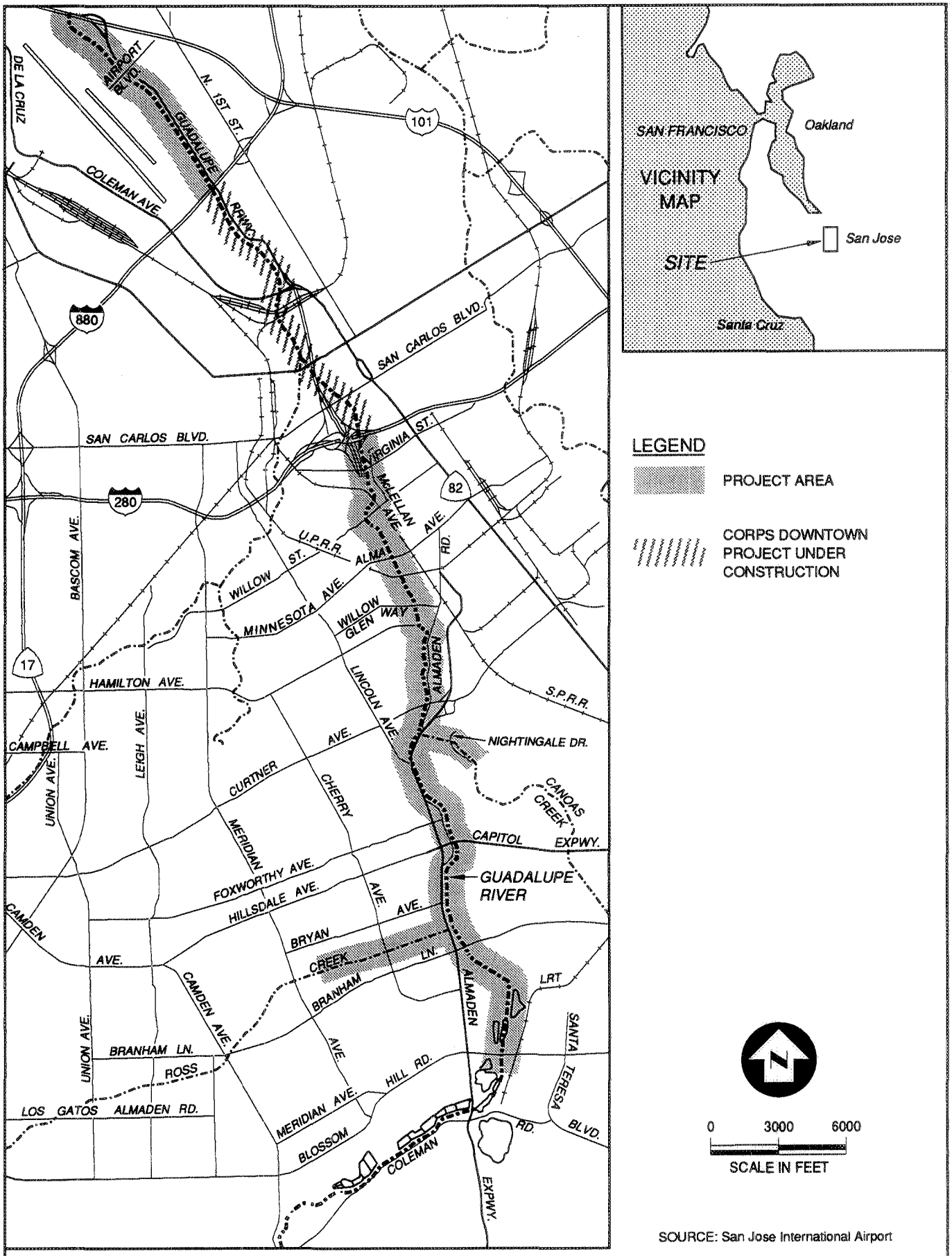
The Guadalupe River flows from south to north through the City of San Jose, emptying into San Francisco Bay (Figure 2.1). Its headwaters originate in the eastern Santa Cruz Mountains; the river itself begins at the confluence of Alamitos Creek and Guadalupe Creek. The Guadalupe River is in the Santa Clara Valley Water District's (the District) Central Flood Control Zone. It flows both through residential areas and through downtown San Jose. Ross Creek, Canoas Creek, and Los Gatos Creek are all tributaries to the Guadalupe River.

The Guadalupe River cannot presently accommodate the one percent flood event, and flooding frequently occurs. The one percent flood, also called the 100-year flood, is defined as having an average frequency of occurrence of once in 100 years, or as having a one percent chance of being equaled or exceeded in any one year. The Guadalupe River Flood Control Project proposes to modify the river channel to accommodate the flow of the one percent flood and smaller flood events. The project would provide flood protection for residences and businesses in the City of San Jose located on the upper Guadalupe River and portions of two tributaries, Ross Creek and Canoas Creek.

The project area includes two discontinuous reaches of the Guadalupe River. One extends from State Route 101 (SR 101) to Interstate 880 (I-880) near the San Jose Airport, and the other extends from Interstate 280 (I-280) to Blossom Hill Road. The District project, which is evaluated in this EIR/EIS, is being coordinated with the U.S. Army Corps of Engineers (Corps) which is a cooperating agency for this environmental document. The Corps is also constructing future flood control modifications for the Guadalupe River channel from I-880 to I-280. The Corps is currently conducting an investigation to determine if there is federal interest in providing flood protection measures on the upper Guadalupe project (Willow Street to Blossom Hill). The federal study overlaps the District project evaluated in this document. The Corps has conducted public scoping meetings to determine the concerns of citizens.

The U.S. Army Corps of Engineers Civil Works Program (Corps) is preparing a flood control feasibility study for the upper Guadalupe River, at the request of the District, which considers the Preferred Project and other alternatives evaluated in this EIR/EIS. The purpose of the Corps feasibility study is to determine the extent that the Corps will fund the District's Preferred Project of this EIR/EIS. The study includes an engineering analysis and a benefit/ cost analysis.

FIGURE 2.1



SOURCE: San Jose International Airport

PROJECT LOCATION AND VICINITY MAP

Guadalupe Flood Control Project

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The Corps feasibility study area includes Reaches 7 through 12 of the upper Guadalupe River, between the Southern Pacific Railroad and Blossom Hill Road. The Corps study would not include a flood control project in Reach 6 of the upper Guadalupe River and Canoas Creek, and would not include bank stabilization measures at the three erosion sites (one in Reach 7 and two in Reach 9) proposed under the Preferred Project of this EIR/EIS.

As part of the Corps feasibility study, the Corps will prepare an Environmental Impact Statement (EIS) The Corps' EIS and this EIR/EIS address potential impacts of a flood control project along the upper Guadalupe River; however, the two documents are independent of each other. The EIS of the Corps feasibility study is anticipated to be available for public review in early 1997. While the public review period for both environmental documents may occur at approximately the same time, the two projects are distinct from one another.

Coordination between the Corps and District on the following three projects is on-going.

1. SCVWD Planning Study on Upper Guadalupe	SR 101 - I-880, I-280 - Blossom Hill (Construction starts 1997)
2. Corps, Sacramento District "Downtown" Construction	I-880 - I-280 (Construction started 1993); completion planned for 1998
3. Corps, San Francisco District Feasibility Study on Upper Guadalupe	I-280 - Blossom Hill (Construction starts 2000)

This EIR/EIS describes the channel modifications which are proposed along eight main reaches of the Guadalupe River between SR 101 and Blossom Hill Road, on Ross Creek between the Guadalupe River and 700 feet upstream of Jarvis Avenue, and on Canoas Creek from the Guadalupe River to about one quarter mile upstream of Nightingale Drive. The project would affect the Guadalupe River channel and its tributaries for a total channel distance of about nine miles (Figure 2.1). Descriptions of proposed channel modifications are presented in Chapter 3 of this document, and detailed descriptions are presented in the Guadalupe River Engineer's Report, which is available for review at the Santa Clara Valley Water District offices (Santa Clara Valley Water District 1997).

The Preferred Project (described above) and various alternatives addressed in this EIR/EIS are discussed in detail in Chapter 3 of this document.

2.2 PROJECT HISTORY

Accounts of flooding on the Guadalupe River date back to 1779, two years after San Jose was first established as a Spanish pueblo. In 1941, the United States Congress enacted the Flood Control Act which authorized the Corps to begin the Guadalupe River and Adjacent Streams General Investigation. In the 1970s, the Corps determined that only the area from I-880 to I-280 qualified for a federally-funded flood control project. The Interim Feasibility Report and Final Environmental Impact Statement for the Corps project was published in July 1985. The Santa Clara Valley Water District has prepared several engineers' reports pertaining to flood control along the Guadalupe River since 1960, some of these in

conjunction with the Corps. The most recent District study, the Guadalupe River Engineers' Report, includes a review of the findings of previous District and Corps reports.

2.3 PURPOSE AND NEED FOR PROJECT

The Guadalupe River has flooded San Jose communities repeatedly, as documented between 1779 and 1986. Recently, flooding occurred in 1980, 1982, 1983, 1986, and 1995. Guadalupe River flooding has inundated as much as 5,200 acres during the most severe floods. River flooding has caused bank erosion, debris accumulation, and sediment deposition, as well as damage to homes, businesses, roadways, bridges and other facilities.

A one percent flood on the Guadalupe River would inundate approximately 7,200 residential units, six public schools, 340 acres of commercial and industrial properties, and 114 acres of agricultural land. A total of approximately 7,500 buildings and 2,200 acres would be flooded, with total flood damages estimated at $280 million.

The proposed project would modify the Guadalupe River channel so that flows up to the one percent flow could be contained without flooding within the project area. Local drainage problems would continue to affect areas near the airport in the vicinity of Reach A. The proposed project would also provide access roads, which are needed to perform regular maintenance such as weed control, erosion repair, and debris removal. The objective of the project is to reduce flood damage by eliminating the threat of the one percent flood.

2.4 PURPOSE AND NEED FOR A JOINT EIR/EIS

A joint Environmental Impact Report/Environmental Impact Statement (EIR/EIS) is required for the Guadalupe River Flood Control Project to meet the requirements of the Clean Water Act, National Environmental Policy Act (NEPA), and California Environmental Quality Act (CEQA). CEQA provisions require that an Environmental Impact Report (EIR) be prepared for a project of this magnitude and impact potential. The District is serving as the lead agency under CEQA and will use this document as input into the decision-making process. The District will evaluate the environmental impacts of construction of the proposed flood control facilities and decide whether to proceed with the project. The EIR/EIS will also be used to determine mitigation measures and other conditions to impose on the project. The EIR/EIS will serve as a forum for public and agency review and comment.

Section 404 of the Clean Water Act (33USC 1344) authorizes the Corps to issue permits, after notice and opportunity for public hearing, for the discharge of dredge or fill material into the Waters of the United States. Section 404(b)(1) of the Clean Water Act specifies that dredge or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystem of concern. The discussion to issue a permit is based on an evaluation of the probable impacts, including cumulative impacts, of the proposed project and its impacts on the quality of the human environment, and therefore has required the preparation of an Environmental Impact Statement. The Corps, San Francisco District, Regulatory Branch is serving as the federal lead agency under NEPA.

CEQA states that a lead agency under CEQA may work with a federal agency to prepare a joint EIR/EIS document which will meet the requirements of both CEQA and NEPA. The lead agency must involve the federal agency in the preparation of the joint document. To reduce duplication between CEQA and NEPA, the lead agency and the federal agency should cooperate by conducting joint planning, environmental research and studies, public hearings, and environmental documents.

The NEPA and CEQA requirements for the determination of significance are distinct. While CEQA requires that a determination of significant impacts be stated in the EIR, NEPA does not. Under NEPA, significance is used to determine whether an EIS, or some lower level of documentation, will be required. Some impacts determined to be significant under CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision to prepare an EIS is made, it is the magnitude of the impact that is evaluated and no judgment of its significance is deemed important for the text. Therefore, for the purposes of the impact discussion in the EIS, determinations of significant impacts will be made in the CEQA context.

In addition, the EIR/EIS would be used by other responsible agencies with approval actions for the proposed project. Potential permit requirements are discussed below.

2.5 REGULATORY AND PERMIT REQUIREMENTS

Table 2.1 presents major permits and approvals that would be required for the Guadalupe Flood Control Project. Regulatory requirements specific to wetlands and special status species and potential obstacles in obtaining permit application approvals are discussed in the biotic resources sections, 4.12, 4.13, and 4.14.

TABLE 2.1

REVIEWS, PERMITS, AND LICENSES REQUIRED FOR THE GUADALUPE FLOOD CONTROL PROJECT

Agency	Act or Regulation	Requirement	Compliance Procedure
Environmental Protection Agency	Clean Air Act as Amended (42 USC Section 7401 *et seq.*)	Compliance with the Act.	Submit application for approval.
U.S. Army Corps of Engineers	Clean Water Act as Amended (33 USC Section 1251 *et seq.*)	Dredge and fill permits.	Submit applications to permitting agency; Prepare NEPA/CEQA documentation.
	National Historic Preservation Act of 1966 (16 USC Section 470 *et seq.*)	Compliance with provisions of the Act including identification of cultural and historical resources that may be affected by the project and consultation with State Historic Preservation officer.	State Historic Preservation office reviews EIR/EIS through State clearinghouse procedure.
U.S. Fish and Wildlife Service	Fish and Wildlife Coordination Act of 1958 (16 USC Section 661 *et seq.*); Endangered Species Act of 1973 (16 USC Section 1531 *et seq.*)	Compliance with provisions of the Acts including coordination with USFWS and CDFG.	Conference under Endangered Species Act regarding proposed listing of steelhead as threatened. Review Draft and Final EIR/EIS.
California Department of Fish and Game	California Endangered Species Act of 1984 (Fish and Game Code Section 2050 *et seq.*)	Compliance with the Act, including consultation with CDFG.	Review Draft and Final EIR/EIS.
	Fish and Game Code 1601-03	Compliance with the Code.	Obtain a stream alteration agreement.

TABLE 2.1 (continued)

Agency	Act or Regulation	Requirement	Compliance Procedure
California Regional Water Quality Control Board	Porter-Cologne Water Quality Control Act of 1966 (California Water Code Section 13000 *et seq.*; CCR Title 23, Chapter 3, Subchapter 15)	Compliance with the Act. NPDES General Construction Activity Storm Water Permit	Submit application to permitting agency for discharges.
California Department of Transportation (Caltrans)		Encroachment Permit for any construction within State right-of-way.	Acquisition of permits and compliance with permit requirements.
City of San Jose Public Works Department	City Code of Regulations	Encroachment Permit for affected roadways in City; Utility Excavation Permit for any activity affecting utility lines in City streets.	Acquisition of permits and compliance with permit requirements.
Santa Clara County Transportation Department	County Code of Regulations	Encroachment Permit for Almaden Expressway.	Acquisition of permits and compliance with permit requirements.
Railroad companies	Railroad company rules and regulations	Maintain safe rail operations including instructions governing signals and flags, train traffic, and accident prevention.	Coordination with railroad companies and compliance with all regulations and instructions.

CHAPTER 3

PREFERRED PROJECT AND ALTERNATIVES

CHAPTER 3

PREFERRED PROJECT AND ALTERNATIVES

3.1 SCREENING OF POTENTIAL ALTERNATIVES

Numerous alternative projects could meet the flood control requirements of the project. A wide range of alternatives is addressed in the Guadalupe River and Adjacent Streams Investigation EIS (U.S. Army Corps of Engineers 1985) and Phase I Study Report (U.S. Army Corps of Engineers 1975). In addition to the No Project Alternative, several alternatives in each of the following categories were developed: Nonstructural Alternatives (flood proofing), Upstream Storage Alternatives, Off-Stream Storage Alternatives, and Channel Modification Alternatives. The Corps determined that only the Channel Modification Alternatives were economically feasible and met the project purpose. A detailed evaluation of alternatives considered and those rejected is contained in the Engineer's Report for this project (Santa Clara Valley Water District, 1997), available for review at the District's office, and is summarized below in Section 3.2. In addition, Appendix D contains an analysis of alternatives in accordance with Section 404(b)(1) of the Clean Water Act. This has been prepared for use by the Corps in their consideration of the project's Section 404 permit.

The Channel Modification Alternatives include combinations of the following conceptual channel modifications: widened channel, bypass channel, and floodwalls/levees. After evaluation of these alternatives based on the criteria of environmental impact, cost, and impact to neighboring homes and businesses, two alternatives were selected for further study: the Preferred Project and the Minimize Vegetation Impacts Alternative. The Minimize Vegetation Impacts Alternative avoids many impacts on riparian vegetation along the Upper Guadalupe River corridor. A cost comparison of the Preferred Project and the Minimize Vegetation Impacts Alternative is included in Table 3.1.

A Stream Restoration Alternative, which combined earth-lined bypasses with extensive channel modifications, also was considered as a potential Channel Modification Alternative with the objective of reestablishing the functions and values of the historic riparian corridor. However, this alternative was rejected because of the substantially greater short-term impacts on vegetation and the high costs of right-of-way acquisition. In addition, there is significant uncertainty regarding the resource agencies' mitigation requirements for major channel restoration projects in which substantial short-term impacts on vegetation would occur in the first phase of creating a more stable, natural riparian corridor. If the short-term impacts must be mitigated, in combination with the substantial expense of restoring the channel to a more natural riparian corridor, then this alternative would be equivalent to double mitigation. It is

TABLE 3.1

**SUMMARY TABLE FOR GUADALUPE RIVER
FLOOD CONTROL COSTS (million dollars)
Reach A, Intersate 280 to Blossom Hill Road, Canoas Creek, andRoss Creek**

Reach	Preferred Project Alternative	Minimize Vegetation Impacts Alternative
Reach A: Highway 101 to I-880	Levee/Floodwall	Levee/Floodwall
Right of Way Cost:	0.0	0.0
Construction Cost:	1.6	1.6
Mitigation: Right of Way Cost:	0.0	0.0
Revegetation Cost:	0.0	0.0
TOTAL COST:	1.6	1.6
Reach 6: I-280 to SPRR	Gabion Bypass Channel	Gabion Bypass Channel
Right of Way Cost:	10.8	10.8
Construction Cost:	7.5	7.5
Mitigation: Right of Way Cost:	0.5	0.5
Revegetation Cost:	0.2	0.2
TOTAL COST:	19.0	19.0
Reach 7: SPRR to UPRR	Gabion Bypass Channel	Gabion Bypass Channel
Right of Way Cost:	8.0	8.0
Construction Cost:	12.8	12.8
Mitigation: Right of Way Cost:	0.0	0.0
Revegetation Cost:	0.2	0.2
TOTAL COST:	21.0	21.0
Reach 8: UPRR to Willow Glen Way	Gabion Bypass Channel	Gabion Bypass Channel
Right of Way Cost:	5.3	5.3
Construction Cost:	5.0	5.0
Mitigation: Right of Way Cost:	0.0	0.0
Revegetation Cost:	0.0	0.0
TOTAL COST:	10.3	10.3

TABLE 3.1 (continued)

Reach	Preferred Project Alternative	Minimize Vegetation Impacts Alternative
Reach 9: Willow Glen Way to Curtner Avenue	Widened Cribwall Channel with Mitigation Bench	West Bank Earth Bypass Channel
Right of Way Cost:	3.9	21.9
Construction Cost:	9.7	4.1
Mitigation: Right of Way Cost:	0.0	0.0
Revegetation Cost:	0.2	0.0
TOTAL COST:	13.8	26.0
Reach 10: Curtner Avenue to Almaden Expressway (SB) & Canoas Creek	Widened Cribwall Channel Mitigation Bench and 3.5' Floodwalls in Canoas Creek	West Bank Earth Bypass Channel and 1.5' Floodwalls in Canoas Creek
Reach 10A		
Right of Way Cost:	0.0	5.1
Construction Cost:	3.3	1.3
Mitigation: Right of Way Cost:	0.0	0.2
Revegetation Cost:	0.1	0.2
Canoas Creek		
Construction Cost:	1.8	1.7
TOTAL COST:	5.2	8.5
Reaches 10B & 10C: Almaden Expressway (SB) to Capitol Expressway	Levees and Widened Gabion Channel with Bench U/S Gage Sta. 23B	Levees and Earth Bypass Channel U/S Gage Sta. 23B
Right of Way Cost:	0.8	8.0
Construction Cost:	5.1	6.8
Mitigation: Right of Way Cost:	3.0	2.0
Revegetation Cost:	0.9	1.1
TOTAL COST:	9.8	17.9

TABLE 3.1 (continued)

Reach	Preferred Project Alternative	Minimize Vegetation Impacts Alternative
Reach 11: Capitol Expressway to Branham Lane	East Bank Widened Gabion Channel with Bench	Earth Bypass Channel
Right of Way Cost:	2.3	13.4
Construction Cost:	7.5	4.9
Mitigation: Right of Way Cost:	0.7	2.0
Revegetation Cost:	0.3	1.3
TOTAL COST:	10.8	21.6
Reach 12: Branham Lane to Blossom Hill Road	Levees Raising	Bypass Channel, Offstream Ponds, and Levee Raising
Right of Way Cost:	0.0	22.2
Construction Cost:	5.5	9.5
Mitigation: Right of Way Cost:	12.1	0.0
Revegetation Cost:	0.7	0.0
TOTAL COST:	18.3	31.7
Ross Creek: Almaden Expressway to Jarvis Avenue	Widened Channel with Articulated Concrete Mat Lining	Widened Channel with Articulated Concrete Mat Lining
Right of Way Cost:	0.0	0.0
Construction Cost:	3.7	3.7
Mitigation: Right of Way Cost:	0.0	0.0
Revegetation Cost:	0.0	0.0
TOTAL COST:	3.7	3.7
Total Project Costs:		
Right of Way Cost:	31.1	94.7
Construction Cost:	63.5	57.3
Mitigation: Right of Way Cost:	16.3	4.7
Revegetation Cost:	2.6	3.0
TOTAL COST:	113.5	159.7

also uncertain whether this alternative would comply with the requirements of the Clean Water Act Section 404 (b)(1) guidelines for implementation of the less environmentally damaging practicable alternative when a fill or discharge into waters of the United States is proposed. Further information on the Stream Restoration Alternative is contained in Section 3.2.

The estimated cost of flood damage to homes, businesses, public buildings, and vehicles in the event of a one percent flood would be $280 million dollars. The present worth value of all future costs includes annual damages, emergency maintenance, cost of flood proofing and flood insurance administration.

The Preferred Project, the Minimize Vegetation Impacts Alternative, and the No Project Alternative are described below in Sections 3.3, 3.4, and 3.5, respectively. Modifications are proposed for nine reaches of the Guadalupe River and on Ross and Canoas Creeks (Figure 3.1). The impact criteria used in selecting the proposed modifications in each reach include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts.

3.2 ALTERNATIVES ELIMINATED FROM FURTHER STUDY

During the preliminary planning phases of this project, a variety of alternatives for containing the one percent flood were evaluated. Alternatives that were considered and discarded due to environmental, social, and economic considerations are discussed below.

Nonstructural Plan

A nonstructural alternative would eliminate inundation of structures in the floodplain without channel modifications. Structures within the floodplain would either be flood proofed or purchased and removed. Flooding would still occur on the average of every 4 years, causing disruption in services and resulting in cleanup costs. Erosion would be expected to continue, requiring repair when structures are threatened.

This alternative is not considered feasible and practicable due to the high cost of flood proofing or purchasing over 7,400 structures in the floodplain (approximately $600 million), the social impact of relocating families and removing homes, the continuing erosion, and the residual damages from flooding.

Upstream Storage (Reservoir Construction)

Three different versions of the upstream storage alternative were investigated by the Corps in the 1975 Phase I Study Report (U.S. Army Corps of Engineers 1975). Two of the proposed measures were on Los Gatos Creek and would have alleviated flooding on the Guadalupe River only downstream of the confluence with Los Gatos Creek.

The third upstream storage option proposed construction of a new dam on Guadalupe Creek approximately 2 miles downstream of the existing Guadalupe Reservoir. The "New Guadalupe Dam" alternative was investigated and the Corps determined that the proposed

dam would not sufficiently reduce the peak one percent flow rate to eliminate the need for extensive channel modifications downstream on the Guadalupe River. The alternative was eliminated from further consideration by the Corps because of the low benefit-to-cost ratio (0.33).

In 1978, the District investigated the feasibility of modifying the existing Almaden Reservoir. Of the three reservoirs on upstream tributaries, Almaden has the largest drainage area (12 square miles) but the smallest storage capacity (1,780 acre-feet).

By raising the existing Almaden Dam by 50 feet, a reservoir with a total storage capacity of 4,400 acre-feet would be created. The additional 2,620 acre-feet would reduce outflow at the dam to only 400 to 500 cubic feet per second (cfs) and would reduce the one percent peak flow by about 1,800 cfs on the Guadalupe River at Blossom Hill Road. In addition, the District reevaluated the possibility of constructing a new dam at the site the Corps had proposed for the "New Guadalupe Dam." The new dam would be 50 feet in height and have a total storage capacity of 2,000 acre-feet. It could reduce the one percent peak flow rate on the Guadalupe River by 1,700 cfs. The combination of raising the Almaden Dam and constructing the New Guadalupe Dam would reduce the Guadalupe River one percent flow rate by about 3,200 cfs at Blossom Hill Road. These flow reductions would still require some channel modifications in the downstream reaches on the Guadalupe River to eliminate flooding in the one percent floodplain. Although the channel section would be somewhat reduced, the major cost items, such as gabion lining and right-of-way, would not change significantly. The amount of area of existing riparian vegetation that would be adversely affected would be similar to other channel modification alternatives.

The Almaden Dam/New Guadalupe Dam alternative would adversely impact the stream corridor environment for 1.6 miles and the adjacent riparian vegetation totaling 76 acres at the new Guadalupe Dam site. Raising Almaden Dam would impact an additional 91 acres of riparian vegetation.

The construction cost estimates for the Guadalupe and Almaden Dams proposals are $25 million and $33 million respectively. The additional cost of channel modifications in Reaches 6 to 10A would be about $50 million, making the total construction cost of this alternative an estimated $108 million. Mitigation cost for this alternative is estimated to be $65 million.

This alternative has been eliminated from further consideration because: (1) the reduction in flow rate is not sufficient to eliminate the need for channel modifications and associated impacts in the study area, (2) substantial impact could occur to the aquatic ecosystem at the dam sites, and (3) the cost of construction and mitigation is too high. This alternative is considered infeasible and impracticable.

Upstream Storage (Reservoir Operation)

Modifying existing upstream reservoir operations could reduce flooding downstream in the Guadalupe River. This alternative was investigated by the District. Existing reservoirs that are used for water supply would be converted to flood control facilities and would be used for temporary attenuation of flood peak flow through flood-routing.

FIGURE 3.1

LEGEND

- REACH DIVISIONS
- SUBREACH DIVISIONS

REACH A
REACH 6
REACH 7
REACH 8
REACH 9
REACH 10
10A
10B
10C
REACH 11
11A
11B
11C
REACH 12
REACH 13

SAN JOSE INTERNATIONAL AIRPORT
GUADALUPE PERCOLATION SYSTEM

0 1000 2000
SCALE IN FEET

PROJECT AREA

GUADALUPE FLOOD CONTROL
SAN JOSE, CALIFORNIA

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One disadvantage of this alternative is that the existing reservoirs do not have sufficient capacity and are not strategically located to have a significant impact on the downstream flood hydrograph. The watershed area in the study reach ranges from 53.2 square miles in Reach 12 to 95.3 square miles in Reach 6. The drainage area for Almaden, Calero, and Guadalupe reservoirs totals less than 25.0 square miles. If the outlets at all three reservoirs were modified and the reservoirs were kept empty to maximize flood protection, the resulting flood hydrograph at Blossom Hill Road would only be reduced by 2,200 cfs. Implementation of this alternative would still require significant channel modifications in the downstream reaches on the Guadalupe River. The additional cost of channel modifications in Reaches 6 to 10A would be approximately $60 million.

The Upstream Storage (Reservoir Operation) Alternative would result in a loss of 13,900 acre-feet per year in water supply, which would need to be replaced at approximately $350 per acre-foot for an annual cost of $4,865,000 per year. Additional water supply may not be readily available for purchase and there may be hydraulic and/or regulatory constraints in the Federal or State systems that affect the ability to import the water to the County. Also, the purchase of additional imported water may have environmental impacts on the area of export, the San Francisco Bay and Delta.

This alternative has been eliminated from further consideration because: (1) the reduction in flow is not sufficient to eliminate required channel modifications in the study area, and (2) the three existing reservoirs currently supplying water to Santa Clara County would have to be kept empty. The Upstream Storage Alternative would have a substantial adverse affect on the availability of water, and therefore, on the fishery, between May and September. This alternative is considered infeasible and impracticable.

Off-Stream Storage

Under the off-stream storage alternative, the peak one percent flows would be diverted into an off-stream storage site which would reduce the Guadalupe River peak flow rate to an amount that could safely flow through the downstream channel. This would eliminate or reduce the required downstream channel improvements. This alternative was investigated in detail in a 1976 report prepared by District staff (Santa Clara Valley Water District 1976). The objective of the plan was to eliminate the channel modification measures that were proposed for Reaches 9 to 10A (Willow Glen Way to Canoas Creek).

The technical feasibility of this proposal poses a high risk. The 1976 report showed that this plan must be designed to a very specific hydrograph peak, shape, and volume. Any deviation and the plan becomes dramatically ineffective. To improve the reliability of this plan with 20 percent contingency in peak flow, the storage volume required would be 6,250 acre-feet

The site of the existing groundwater recharge ponds and adjacent lands north of Blossom Hill Road was the only appropriately located and large enough site to be considered. The total storage volume of the existing ponds is only about 650 acre-feet. An additional 332 acres of land would need to be purchased and excavated approximately 17 feet deep to provide the additional 5,600 acre-feet of storage. Some of the land has since been developed and is unavailable.

The off-stream storage alternative would still require some channel modifications in Reaches 6 to 8 to provide one percent capacity, which is estimated to cost an additional $55 million. Hydrologic constraints would require that the storage ponds be kept completely dry except at time of peak flows in the Guadalupe River. This would be difficult due to variable groundwater levels, infiltration from adjacent recharge facilities, and other operational limitations. Once used to store floodwaters, the ponds would not continue to operate as groundwater recharge facilities because the silt and debris would clog infiltration.

Because of high cost ($600 million with more than $400 million in real estate cost), site availability, operational constraints, and channel modification requirements, the off-stream storage alternative is considered infeasible and impracticable.

Stream Restoration Alternative

This alternative is a variation of the Channel Modification Alternative and is described and compared to the Minimize Vegetation Impacts Alternative (see Section 3.4). The Stream Restoration Alternative, a fluvial geomorphological approach, consists of channel modifications in Reach A and Reaches 6-12 to create a low-flow channel and an active floodplain terrace. A low-flow channel would be constructed in each reach to carry the 1.5-year frequency flow ("bankfull" flow); bypass channels and/or floodplain terraces would carry higher flows. This alternative incorporates, to the extent feasible, stream restoration techniques throughout the project area.

The goal of the fluvial geomorphological approach is to restore the natural sinuosity of the Guadalupe River channel; enhance sediment transport; and provide for long-term stabilization of the banks by restoring the plan, profile, and geometry of the active channel and incorporating strategically placed rock weirs, root wads, and other appropriate bio-remediation elements including revegetation. This alternative would provide an opportunity for significant new riparian vegetation to re-establish and strives to create a functional physical and biological river system that allows natural processes to occur while restoring and maintaining habitat values for fish and wildlife.

The Stream Restoration Alternative is similar to the Minimize Vegetation Impacts Alternative (see Section 3.4), with the main difference being the need for bypasses in Reaches 7 and 8. Extensive in-channel modifications to accommodate a constructed bankfull channel would also be required under the stream restoration alternative.

In each reach, the existing Guadalupe River channel would be modified to incorporate a new bankfull channel with a sinuosity that matches the slope, flow, and geomorphological characteristics of the Guadalupe River. Some existing streamside vegetation would be affected during construction. Both sides of the new bankfull channel would be revegetated and/or stabilized. Bypass channels or open floodplain terraces would be constructed to accommodate floodflows. Specific features of the Stream Restoration Alternative are described below.

Estimates of habitat affected by the Stream Restoration Alternative are based on assumptions that approximately 90 percent of the existing wetlands in Reach A and Reaches 6-12 (approximately 8.0 acres of wetlands) would be affected due to the extensive work in-

channel. In addition, approximately 20 percent more of the riparian habitat and shaded riverine aquatic (SRA) cover in most reaches would be affected than with the Minimize Vegetation Impacts Alternative due to the construction of a bankfull channel. Impacts in Reaches 7 and 8 would be greater (approximately 40 percent more) under the stream restoration alternative than the Minimize Vegetation Impacts Alternative due to the construction of an additional bypass channel. In total, over 6.0 acres of riparian habitat and over 2,500 linear feet of SRA cover would be affected.

Reach A. A bankfull channel would be excavated to enhance sediment transport. Little or no riparian revegetation could be planted unless the existing boundaries of this reach are widened significantly to carry the one percent flood.

Reaches 6-8. A bankfull channel would be excavated within the existing Guadalupe River bottom. In Reach 6, an earth-lined east bank bypass channel would be constructed. In Reaches 7 and 8, east and west bank earth-lined bypass channels would be constructed. The double bypass channels are required in Reaches 7 and 8 to accommodate the one percent flood because the side slopes of the earth-lined bypass channels are significantly less than the gabion side slopes of the Preferred Project and Minimize Vegetation Impacts Alternative.

Reaches 9 and 10A. An earth-lined bypass channel would be constructed west of the natural channel similar to those proposed in the Minimize Vegetation Impacts Alternative. A new bankfull channel would be excavated within the existing river channel.

Reach 10B. As in the Preferred Project and Minimize Vegetation Impacts Alternative, a sinuous bankfull channel would be constructed and banks would be revegetated.

Reach 10C. This reach would be similar to the Minimize Vegetation Impacts Alternative except that a bankfull channel would be constructed within the existing channel.

Reaches 11A and 11B. As in the Minimize Vegetation Impacts Alternative, Reach 11A would include an east bank earth-lined bypass channel. Reach 11B would include a west bank widened cribwall channel similar to the Preferred Project and the Minimize Vegetation Impacts Alternative. In addition, a bankfull channel would be excavated within the existing channel.

Reach 11C. An earth-lined bypass channel would be constructed on the west bank, and a bankfull channel would be constructed within the existing Guadalupe River channel, as in the Minimize Vegetation Impacts Alternative.

Reach 12. This reach would be similar to the Minimize Vegetation Impacts Alternative except that a bankfull channel would be created and includes replacing the existing in-stream percolation ponds with off-stream ponds and west bank channel widening.

This alternative has been eliminated from further consideration because: (1) substantially greater amounts of jurisdictional wetlands would be affected during construction than under the Preferred Project and Minimize Vegetation Impacts Alternative, (2) greater amounts of riparian vegetation and SRA would be affected during construction than under the Minimize Vegetation Impacts Alternative, (3) regulatory uncertainty exists regarding the required

mitigation for construction impacts when the long-term goal is stream restoration, and (4) the cost of construction would be approximately $190 million. It is also uncertain whether this alternative would comply with the requirements of the Clean Water Act Section 404 (b)(1) guidelines for implementation of the less environmentally damaging practicable alternative when a fill or discharge into waters of the United States is proposed.

3.3 PREFERRED PROJECT

The Preferred Project includes channel modifications in two discontinuous segments of the Guadalupe River, one from State Route 101 to Interstate 880 (Reach A) and another from Interstate 280 to Blossom Hill Road (Reaches 6 to 12) (Figure 2.1). Fishery impact mitigation activities are proposed in Reach 13, upstream of Blossom Hill Road. Flood prevention facilities are also proposed on two tributaries, Ross Creek and Canoas Creek. Flooding issues that have been identified in these areas and proposed modifications are summarized in Table 3.2. Figure 3.2 illustrates the proposed modifications in Reach A. Figures 3.3a, b, and c illustrate proposed modifications in Reaches 6 through 13 and on Canoas and Ross creeks.

Reach A: SR 101 to I-880 - Levee Raising and Channel Widening

Reach A is located 2.25 miles north of I-280 and is not contiguous with Reach 6. The channel in this reach is nearly adequate and needs only minor modifications to convey the one percent flow with adequate freeboard. Proposed flood control modifications and responsible parties in Reach A are summarized in Table 3.3. From Airport Boulevard to I-880 the channel would be widened to the east by Caltrans, creating a bench up to 110 feet wide about 10 feet above the channel bottom. A portion of the bench would be used as a maintenance road and the remainder would be revegetated. The District would construct a floodwall up to 2 feet on the west bank and a levee on the east bank from Highway 101 to Airport Island Bridge. In the interim, before Highway 87 is constructed, levees up to 2 feet high would be constructed on both the east bank and on the west bank from Airport Island Bridge to Airport Parkway Bridge. The 15-foot wide maintenance road on the west top of the bank would include underpasses for Highway 101, Airport Island Bridge, Airport Parkway Bridge, and Future Skyport Drive Bridge (proposed by the City) on access ramps. The undercrossing at I-880 connects the proposed river walk south. Soil investigations would be performed on existing levees. If the levee is determined to be unstable, it would be reinforced. Levee reinforcement would be performed so as to avoid impacts to riparian vegetation.

Reaches 6-13

The following text describes flood control and related facilities that are proposed for each reach and subreach within the Guadalupe River between I-280 and the drop structure upstream of Blossom Hill Road. Proposed modifications, detailed specifications of those modifications, and other requirements (such as removal of structures and roadway modifications) are listed in Table 3.4.

TABLE 3.2

SUMMARY OF PROJECT COMPONENTS

Reach[a]	Location[a]	Issue	Proposed Modification[b]
Guadalupe River			
Reach A	S.R. 101 to I-880	Inadequate freeboard	Minor channel modifications, addition of levee and floodwall
Reaches 6-12	Reaches 6-8, I-280 to Willow Glen Way	Existing channel has inadequate capacity to convey the 100-year floodflow and is subject to erosion	Bypass channel to be constructed east of the existing channel
	Reaches 9-10A, Willow Glen Way to Southbound Almaden Expressway	This portion of the channel is inadequate to convey the 100-year floodflow and is subject to erosion	Channel widening, bypass channel, bank stabilization, and revegetation
	Reaches 10B-12, Southbound Almaden Expressway to Blossom Hill Road	The channel is inadequate to convey the 100-year floodflow and is subject to erosion	Channel widening, revegetation and levees.
Tributaries			
Canoas Creek	Almaden Expwy. to end of Nightingale Drive	The tributary is affected by backwater from flow in the Guadalupe River	Floodwalls and new culverts
Ross Creek	Almaden Expwy. to 700 feet upstream of Jarvis Avenue	The tributary is affected by backwater from flow in the Guadalupe River	Channel widening, channel lining, and new culverts

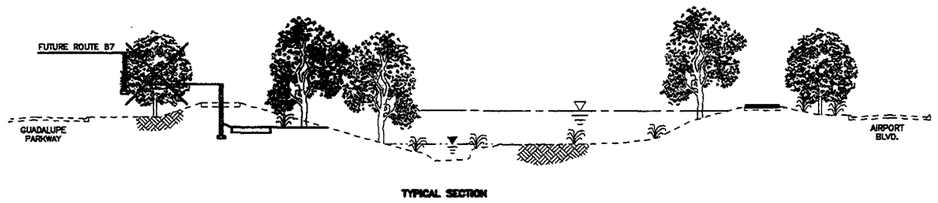
a Refer to Figure 3.1

b For detailed list of proposed activities, refer to Tables 3.3 and 3.4.

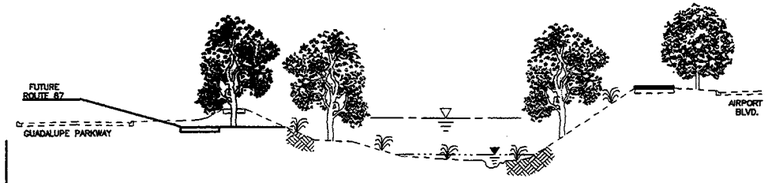
TABLE 3.3

PROPOSED FLOOD CONTROL MODIFICATIONS - REACH A OF THE GUADALUPE RIVER (U.S. 101 TO I-880 - AIRPORT AREA)

Proposed Action	Specifications	Responsible Party
Raise the proposed Guadalupe Expwy. profile on east bank	Elevation increase of 4-18 feet	Caltrans
Excavate the east bank to create a vegetation bench	From Airport Boulevard to I-880. The bench would be 110 feet wide.	Caltrans
Construct west bank maintenance road	15-foot wide on the west bank (top of bank). Including depressed maintenance roads under U.S. 101, Airport Island, Airport Parkway and future Skyport Dr. bridges.	District
Construct access ramps	From the west top of bank to the channel bottom.	District
Construct floodwall and levee	On the east side of Airport Boulevard, from Airport Parkway to 6,300 feet downstream of Airport Parkway.	District



TYPICAL SECTION



TYPICAL SECTION

CALTRANS FUTURE ROUTE 87 EXTENSION TO BE ON EXISTING GUADALUPE PARKWAY ALIGNMENT

HWY 101

AIRPORT PKWY.

FUTURE SKYPORT DRIVE BRIDGE

GUADALUPE PKWY.

I-880

IN REACH A

AIRPORT PARKING LOT

AIRPORT BLVD.

BEGIN PROJECT

AIRPORT ISLAND BRIDGE

SAN JOSE INTERNATIONAL AIRPORT

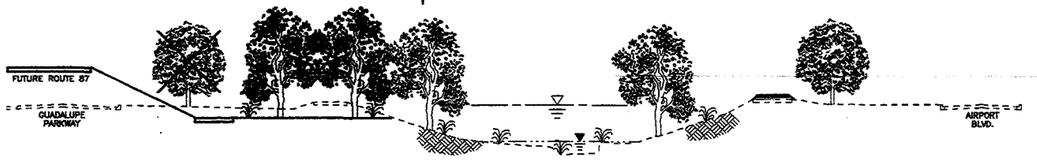
END PROJECT IN REACH A

LEGEND

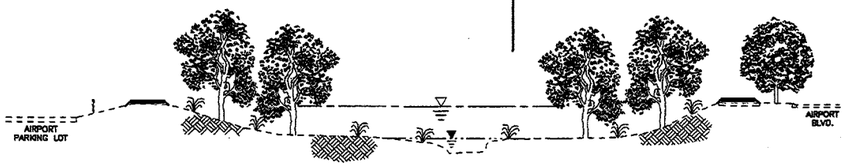
- PROPOSED OPEN BYPASS CHANNEL
- PROPOSED FLOODWALLS
- PROPOSED CHANNEL WIDENING
- PROPOSED LEVEES
- PLANNING AREA BOUNDARY
- NEW OR REPLACED BRIDGE
- EXISTING NATURAL CREEK
- PROPOSED REVEGETATION AREAS

TYPICAL SECTIONS

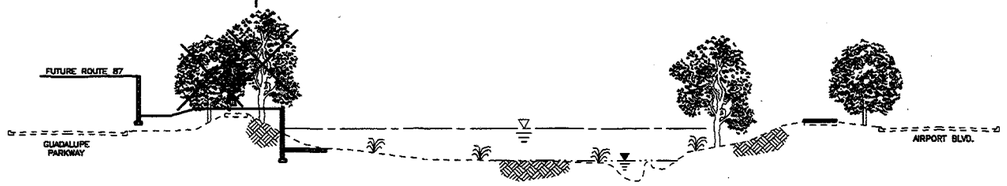
- PROPOSED GROUND
- EXISTING GROUND
- 100 YEAR FLOOD ELEVATION
- EXISTING ORDINARY HIGH WATER
- EXISTING FEATURES TO BE REMOVED



TYPICAL SECTION



TYPICAL SECTION



TYPICAL SECTION

REV	DESCRIPTION	DATE	APPR
	REDUCED PLAN USE SCALE BELOW (0 1 2 3 — 3 INCHES ON ORIGINAL PLAN)		

REFERENCE INFORMATION AND NOTES
1. All typical sections are viewed looking upstream.

DATE	12-26-96
DESIGN	T. IBARRA
DRAWN	S.L/C.M
CHECKED	T. IBARRA

Santa Clara Valley Water District

ENGINEERING CERTIFICATION — PROJECT ENGINEER R.C.E. NO. 48911

ENGINEERING APPROVAL — SUPERVISING ENGINEER R.C.E. NO. 25093

GUADALUPE RIVER PREFERRED PROJECT

HWY 101 TO HWY 880 (REACH A)

PROPOSED CHANNEL MODIFICATIONS

SCALE: NOT TO SCALE

FIGURE 3.2 OF 4

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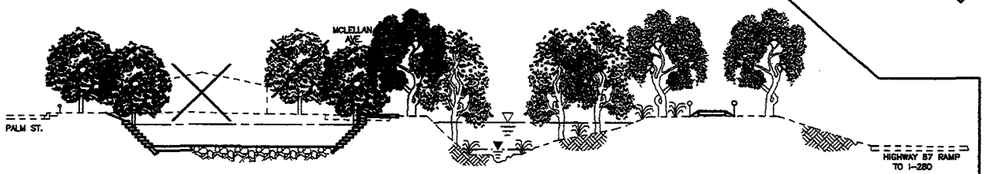
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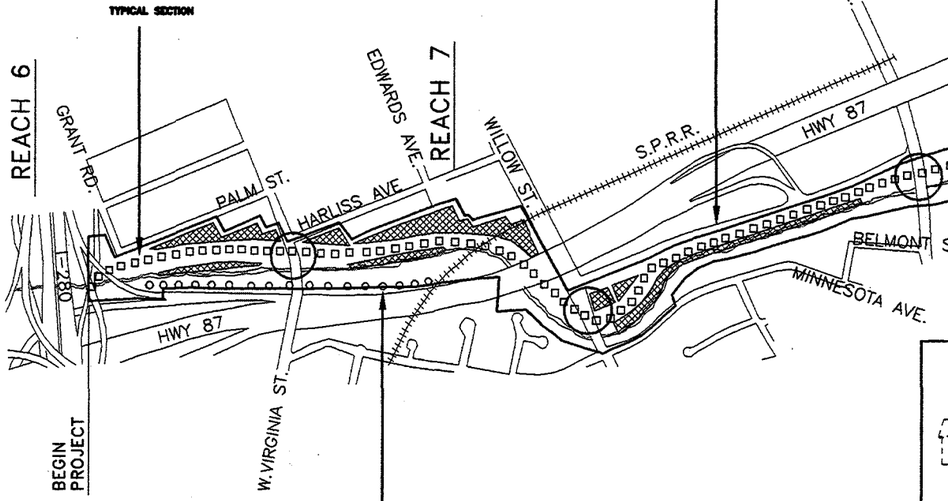
TYPICAL SECTION



TYPICAL SECTION



TYPICAL SECTION



LEGEND

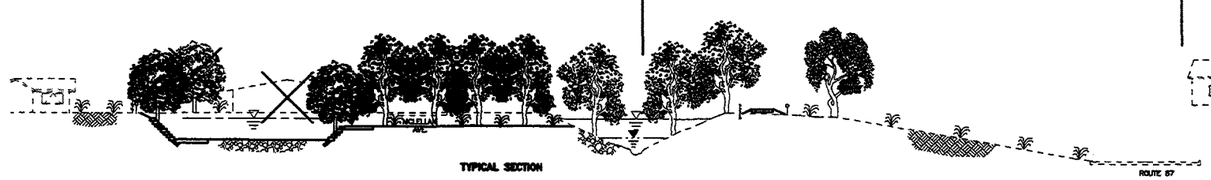
- PROPOSED OPEN BYPASS CHANNEL
- PROPOSED FLOODWALLS
- PROPOSED CHANNEL WIDENING
- PROPOSED LEVEES
- PLANNING AREA BOUNDARY
- NEW OR REPLACED BRIDGE
- EXISTING NATURAL CREEK
- PROPOSED REVEGETATION AREAS

TYPICAL SECTIONS

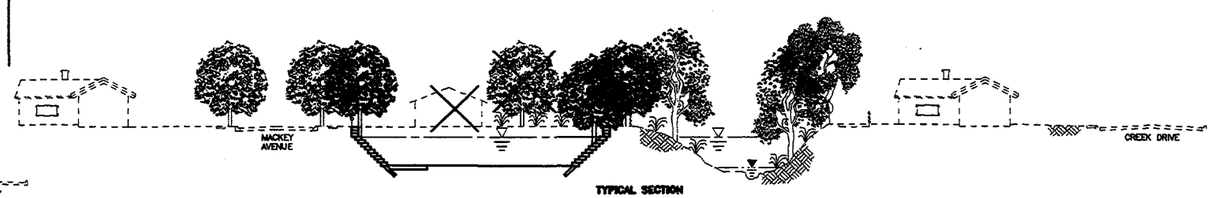
- PROPOSED GROUND
- EXISTING GROUND
- 100 YEAR FLOOD ELEVATION
- EXISTING ORDINARY HIGH WATER
- EXISTING FEATURES TO BE REMOVED



TYPICAL SECTION



TYPICAL SECTION



TYPICAL SECTION

REV	DESCRIPTION	DATE	APPR
	REDUCED PLAN USE SCALE BELOW (0 1 2 3 — 3 INCHES ON ORIGINAL PLAN)		

REFERENCE INFORMATION AND NOTES
1. All typical sections are viewed looking upstream.

DATE	12-26-96
DESIGN	T. IBARRA
DRAWN	S.L./C.M.
CHECKED	T. IBARRA

Santa Clara Valley Water District

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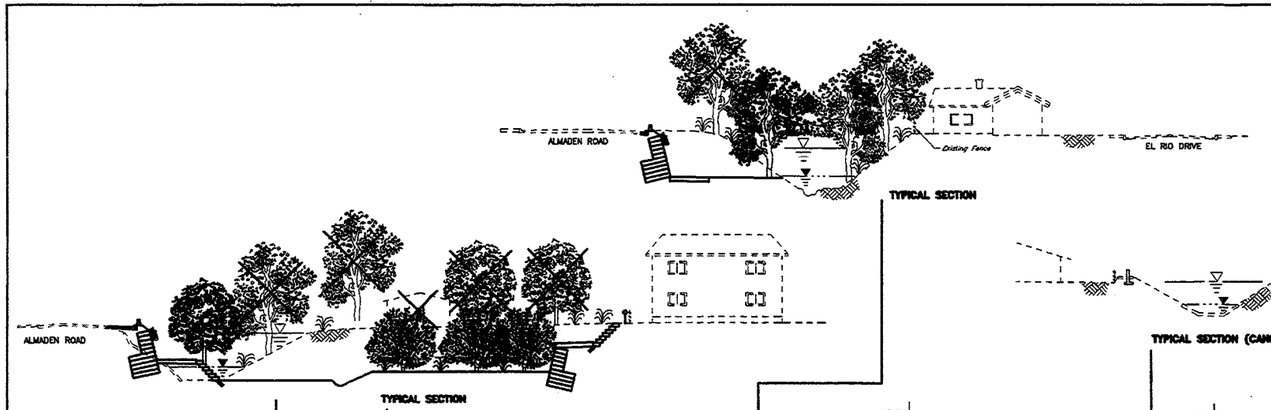
ENGINEERING APPROVAL — SUPERVISING ENGINEER R.C.E. NO. 25093

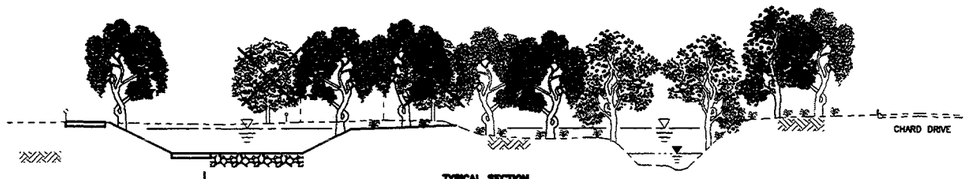
GUADALUPE RIVER PREFERRED PROJECT
HWY 280 TO COLEMAN ROAD (REACHES 6 – 9)
PROPOSED CHANNEL MODIFICATIONS

SCALE: NOT TO SCALE

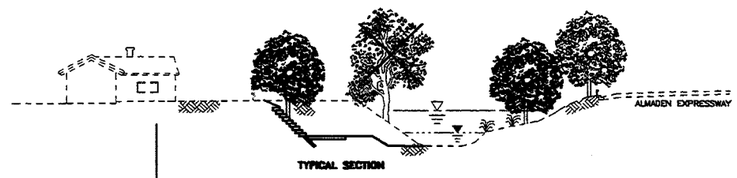
FIGURE 3.3A OF 4

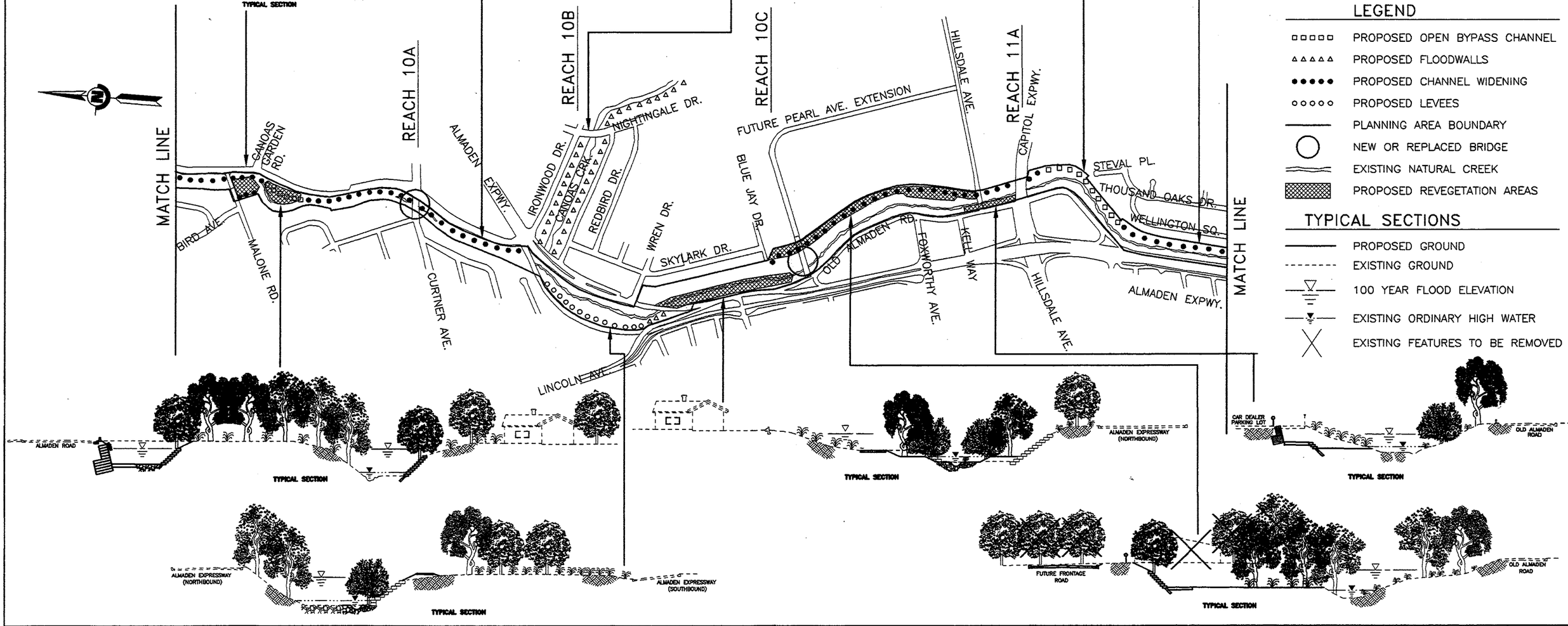
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LEGEND

- PROPOSED OPEN BYPASS CHANNEL
- PROPOSED FLOODWALLS
- PROPOSED CHANNEL WIDENING
- PROPOSED LEVEES
- PLANNING AREA BOUNDARY
- NEW OR REPLACED BRIDGE
- EXISTING NATURAL CREEK
- PROPOSED REVEGETATION AREAS

TYPICAL SECTIONS

- PROPOSED GROUND
- EXISTING GROUND
- 100 YEAR FLOOD ELEVATION
- EXISTING ORDINARY HIGH WATER
- EXISTING FEATURES TO BE REMOVED

REV	DESCRIPTION	DATE	APPR
	REDUCED PLAN USE SCALE BELOW (0 1 2 3 — 3 INCHES ON ORIGINAL PLAN)		

REFERENCE INFORMATION AND NOTES
1. All typical sections are viewed looking upstream.

DATE	12-26-96
DESIGN	T. IBARRA
DRAWN	S.L./C.M.
CHECKED	T. IBARRA

Santa Clara Valley Water District

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GUADALUPE RIVER PREFERRED PROJECT

HWY 280 TO COLEMAN ROAD (REACHES 9 – 11A)

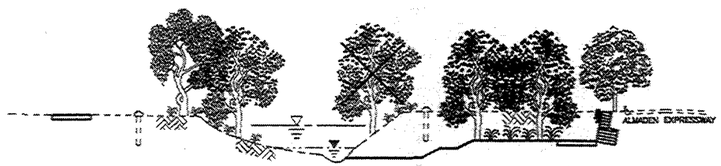
PROPOSED CHANNEL MODIFICATIONS

SCALE: NOT TO SCALE

FIGURE 3.3B OF 4

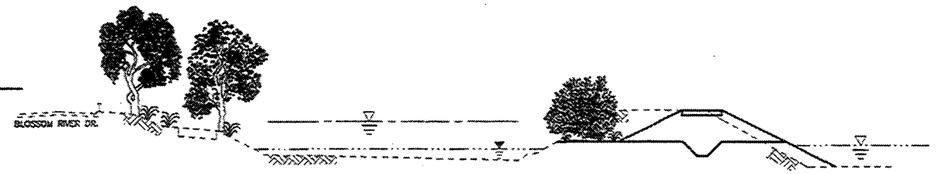
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TYPICAL SECTION

TYPICAL SECTION



TYPICAL SECTION

REACH 11B

REACH 11C

REACH 12

REACH 13

MATCH LINE

THOUSAND OAKS DR.

WELLINGTON SQUARE

BRANHAM LN.

PROPOSED MITIGATION PONDS

PERC PONDS

LIGHT RAIL

FUTURE SANCHEZ DRIVE

FUTURE CHYNOWETH AVE.

HWY 85

FOXCHASE DR.

BLOSSOM HILL RD.

COLEMAN RD.

ALMADEN LAKE

ALMADEN EXPWY.

PERC POND

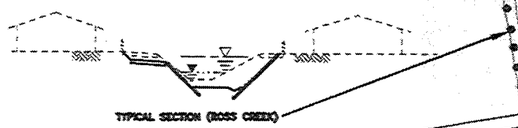
CHERRY AVE.

ROSS CREEK

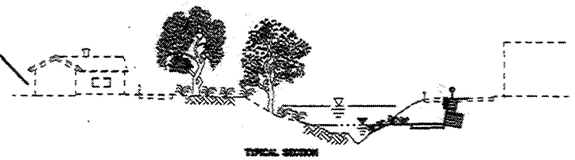
CHERRY AVE.

JARVIS AVE.

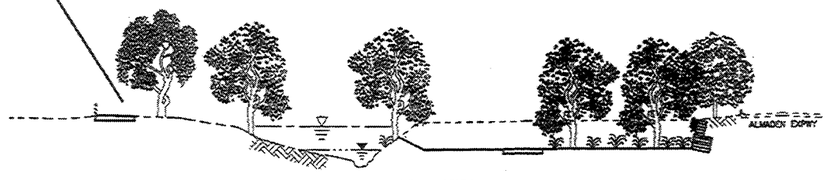
END PROJECT



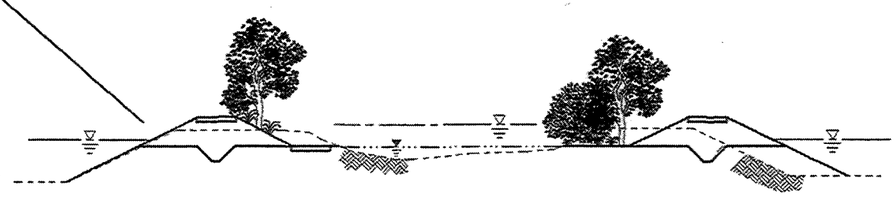
TYPICAL SECTION (ROSS CREEK)



TYPICAL SECTION



TYPICAL SECTION



TYPICAL SECTION

LEGEND

- PROPOSED OPEN BYPASS CHANNEL
- PROPOSED FLOODWALLS
- PROPOSED CHANNEL WIDENING
- PROPOSED LEVEES
- PLANNING AREA BOUNDARY
- NEW OR REPLACED BRIDGE
- EXISTING NATURAL CREEK
- PROPOSED REVEGETATION AREAS

TYPICAL SECTIONS

- PROPOSED GROUND
- EXISTING GROUND
- 100 YEAR FLOOD ELEVATION
- EXISTING ORDINARY HIGH WATER
- EXISTING FEATURES TO BE REMOVED

REV	DESCRIPTION	DATE	APPR
	REDUCED PLAN USE SCALE BELOW (0 1 2 3 — 3 INCHES ON ORIGINAL PLAN)		

REFERENCE INFORMATION AND NOTES
1. All typical sections are viewed looking upstream.

DATE 12-26-96
DESIGN T. IBARRA
DRAWN S.L./C.M.
CHECKED T. IBARRA

Santa Clara Valley Water District

ENGINEERING CERTIFICATION — PROJECT ENGINEER R.C.E. NO. 48911

ENGINEERING APPROVAL — SUPERVISING ENGINEER R.C.E. NO. 25093

GUADALUPE RIVER PREFERRED PROJECT
HWY 280 TO COLEMAN ROAD (REACHES 11A – 13)
PROPOSED CHANNEL MODIFICATIONS

SCALE NOT TO SCALE

FIGURE 3.3C OF 4

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TABLE 3.4

PROPOSED FLOOD CONTROL MODIFICATIONS TO THE UPPER GUADALUPE RIVER - REACHES 6-12 AND TRIBUTARIES

Reach	Proposed Modification	Specifications	Other Requirements
6 (I-280 to SPRR)	Bypass channel with drop structure (with roadway modifications)	Confluence located just upstream of I-280 at Grant Road. Four-foot drop structure of mattress gabions. Channel would be 15 feet deep and 85 feet wide and lined with stepped gabions with 1:1 slopes. The bypass invert would be sloped 2 percent toward the west bank to create a low-flow channel and would be rock-lined.	Remove McLellan Avenue. Realign intersection of Palm and Grant Streets. Modify the West Virginia Street/Harliss Avenue and McLellan/Edwards Avenue intersections. Remove 54 homes and one partial backyard area. Relocate utilities; coordinate with the City.
	Lower island bank between the River and the Bypass Channel	Upstream of West Virginia Street the island bank would be lowered 8 feet for 800 feet.	
	Increase the height of the west bank levee and construct a maintenance road	The levee would be raised to 3.5 feet above 1 percent water surface level to meet FEMA Freeboard requirements. A 12-foot wide maintenance road would be constructed on top of the levee.	Soil investigation would be performed on the existing levee prior to construction. If the levee is unstable, it would be reinforced.
	Construct access ramps and maintenance road	Construct access ramps from Palm Street and Edwards Avenue to the bottom of the bypass channel and from the island bank maintenance road to the existing channel bottom. An 18-foot wide continuous maintenance road would be located on the east side of the bypass channel bottom and on the top of the island bank.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
6 (cont.)	Bridge over bypass channel at West Virginia Street	A 120-foot wide, three-span bridge next to the existing two-span bridge. Stepped gabions with 1:1 slopes would be used under the bridge.	
	Revegetation	Revegetation of the lower island bank and top of east bank with native riparian species. Tree wells would be constructed on gabions where feasible.	
7 (SPRR to UPRR)	Bypass channel	The bypass channel would be east of the Guadalupe River and would connect with the Reach 6 bypass. The bottom width would vary from 30 to 85 feet with stepped gabions and 1:1 slopes; rock-lined bottom of the channel. The invert would slope 2 percent toward the west bank to create a low-flow channel.	Relocate 13 commercial businesses upstream of Willow Street between Lelong Street and the existing channel.
	Culvert under SPRR tracks	Quadruple-cell 20 by 17 foot RCB culvert.	
	Lower island bank between the River and bypass channel	From Willow Street upstream for 1,550 feet, the island bank would be lowered about 8 feet, and lowered 10 feet for an additional 500 feet downstream to Alma Avenue.	Coordinate with Southern Pacific Transportation Company.
	Bridge over bypass channel at Willow Street	A three-span bridge over the bypass channel at Willow Street. From Willow Street to about 300 feet upstream, the bottom width of the bypass channel would be 85 feet with 1:1 side slopes of stepped gabions. Adjacent to Lelong Street, the channel bottom width would be 30 feet.	
	Bridge over bypass channel at Alma Avenue	A two-span bridge over the bypass channel at Alma Avenue.	
	Culvert under UPRR tracks	Triple-cell 20 by 17 foot RCB culvert.	Coordinate with Union Pacific Railroad.

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
7 (cont.)	Construct a flood wall downstream along Lelong Street	Beginning just downstream of Alma Avenue for 300 feet on the east bank of the bypass channel.	
	Bypass channel from Alma Avenue to UPRR tracks	Bypass channel with 60-foot bottom width and stepped gabion sides at 1:1 side slopes.	
	Construct access ramps and maintenance roads	Construct a continuous 15-foot wide maintenance road on the island bank between the bypass and the River from Willow to Alma Avenue. Two ramps would provide access to the River channel bottom at Alma Avenue. Access would be provided to the bypass channel bottom by two ramps at Willow Street and one on the east bank at Alma Avenue.	Obtain right-of-way from Elk's Lodge for proposed bypass. Elk's Lodge parking lot would need to be reconfigured.
	Revegetation	Revegetate 1.5 acres of island bank with native species. Revegetate top of east bank of bypass to create 1.3 acres of revegetated area. Tree wells would be constructed on gabions where feasible.	
	Relocate utilities	Relocating the sanitary sewer siphons at Willow Street bridge would be coordinated with the City.	
	Repair erosion on the west bank.	Adjacent to Dorothy Avenue, 500-foot length of eroded bank would be repaired using bioengineered methods.	
8 (UPRR to Willow Glen Way)	Bypass channel (with roadway modifications)	The bypass channel would be east of the Guadalupe River and would connect with the Reach 7 bypass. The bottom width would be 85 feet with 1:1 stepped gabion side slopes. The bottom of the bypass would slope 2 percent toward the west bank to create a low-flow channel.	Remove 23 homes on the west side of Mackey Avenue (existing sidewalk and street trees to remain). Modify the intersection of Mackey Avenue, Willow Glen Way, and Northern Avenue. Coordinate with the City.

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
8 (cont.)	Construct a 190-foot weir	The weir would divert high flows into the bypass channel. Weir would consist of stepped gabions. Flows less than 1,500 cfs would remain in the River channel. During the 100-year flows the weir would divert 9,600 cfs, leaving 5,000 cfs in the River channel. The east bank of the river, just downstream of the weir would be protected with gabions from the top of the bank to the toe of the slope for a distance of 150 feet.	
	Construct access ramps and maintenance roads	An 18-foot wide depressed maintenance road would be located on the east side of the bypass channel bottom. Access ramps would be constructed from Dawson and Mackey Avenues.	
	Revegetation	Tree wells would be constructed in gabions where feasible.	
	Relocate utilities	Relocating the sanitary sewer siphons upstream of the UPRR tracks would be coordinated with the City.	
9 (Willow Glen Way to Curtner Avenue)	Widen the east bank of the channel	Widen channel to create a floodway of 20 to 70 feet. Create a bench for flood flows. The bench would be 5 to 12 feet above the natural stream bottom. The east bank would consist of 1:6 cribwalls in most locations with a few stepped gabions at 1:1 slopes. Vegetation below the bench would be preserved where possible. Construction along Almaden Road would be coordinated with the City.	Remove six homes, four partial backyard areas, and two businesses. Relocate one well and piping. Coordinate with San Jose Water Company and the City.
	Repair erosion on west bank	At Pine Avenue and upstream of Malone Road, 500-foot length of eroded bank would be protected with stepped gabions. Downstream of Curtner Avenue, 600-foot length of eroded bank would be repaired using bioengineered methods.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
9 (cont.)	Replace bridge at Willow Glen Way	2-span, 140-foot wide bridge with 18-foot wide depressed maintenance road on east bank under the bridge 10 feet above the existing channel bottom. Stepped gabions at 1:1 slopes would be used on the east bank and west banks. Existing pedestrian bridge would be removed and salvaged for the City.	Bridge replacement would be cost-shared with the City.
	Maintenance road	18-foot wide located on 20- to 70-foot wide east bank floodway. The bench would slope 2 percent toward river for drainage.	
	Pine and Malone Bypass Channels	500-foot channel at Pine Avenue and 500-foot channel upstream of Malone Road. Bottom width 40 feet. Elevation 9 feet above existing channel bottom for Pine Bypass and 5 feet above existing channel bottom for Malone Bypass channel. Stepped gabions at 1:1 slope and crib walls would be on the banks.	
	Revegetation	Revegetate on depressed bench (10 feet wide) and on top of bypass islands. Vegetation would be provided on cribwalls where feasible.	
	Relocate utilities	Relocating the water line at Willow Glen Way would be coordinated with the City. Relocating the water wells and associated piping would be coordinated with the San Jose Water Company.	
10A (Curtner Avenue to SB Almaden Expwy.)	Widen the east bank	Widen channel to create a floodway of 18 to 40 feet wide. Create bench for floodway and revegetation. The bench would be approximately 5 feet above the natural stream bottom. The east bank would consist of cribwall with 1:6 sideslope. Vegetation below the bench would be preserved wherever possible.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
10A (cont.)	Replace Curtner Avenue Bridge	110-foot wide, three-span bridge. The construction of this bridge will be coordinated with the City. The maintenance road would continue under the bridge.	
	Maintenance road and access ramp	18-foot wide road on the floodway from Reach 9 to Canoas Creek confluence. A turn-around area would be located just downstream of Almaden Expwy.	
	Revegetation	Revegetate on depressed bench (10 feet wide)	
10B (SB Almaden Expwy. to Gage 23B)	Construct a levee between northbound and southbound Almaden Expwy.	Levee would be 4 feet high with a top width of 15 feet and 2:1 side slopes. The alignment would meander to avoid existing trees. At Lincoln Avenue overpass, a 4-foot floodwall would be constructed for 300 feet. Low flow channel would be constructed, along with a 5-foot wide riparian vegetation corridor.	
	Construct maintenance road and access ramps	Along the east bank upstream of northbound Almaden Expwy. an existing bench would be partially excavated and a low flow channel provided. Access ramp to maintenance road would be modified.	
	Modify weir at Gaging Station 23B	Lower the concrete foundation of the weir to allow water to spill directly into pools and allow fish passage.	
	Construct Pearl Avenue bridge	Construction of a bridge just downstream of Gaging Station 23B. Construction would be coordinated with the City.	Bridge construction would be cost-shared with the City.
	Revegetation	Revegetate portion of the channel bottom from southbound Almaden Expwy. to Gaging Station 23B.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
10C (Gage 23B to Capitol Expwy.)	Excavate bench on east bank	Upstream of Gaging Station 23B, the east bank would be excavated and a bench up to 58 feet wide would be created 8 feet above the existing channel bottom. The bench would be sloped 2 percent towards the existing channel for drainage. The upper portion of the east bank would be protected with stepped gabions with a 1:1 slope. Tree wells would be provided where feasible.	Construction at the Valley View Packing Plant would begin after the plant has permanently ceased operations.
		Upstream of Hillsdale Avenue, cribwalls at 1:6 slope would be used for the east bank.	Purchase portions of the Rubino property site and of the automobile dealership site.
	Construct maintenance road and access ramps	An 18-foot wide maintenance road would be located on the floodway at the toe of the upper slope. Ramps would provide access from Hillsdale Avenue to the channel.	
	Remove Hillsdale Avenue Bridge	The Hillsdale bridge would be removed after the Pearl Avenue Bridge is constructed.	Coordinate with the City.
	Remove abandoned stream gage	The stream gage, located just downstream of Hillsdale Avenue, consists of a concrete apron and weir that is a barrier to fish.	
	Revegetation	Revegetate portions of the depressed bench.	
11A (Capitol Expwy. to Bryan Avenue)	Bypass channel	A stepped gabion and cribwall bypass channel would be built on the east side of the channel approximately 6 feet above the invert. The bypass would begin 500 feet upstream and end 950 feet upstream of Capital Expwy.	Would require purchase of two properties.

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
11A (cont.)	Widen the east bank to create a bench for floodway	Beginning 950 feet upstream of Capitol Expwy. the east bank would be widened to create an 18-foot wide bench for floodway. The bench would be 4.5 to 9 feet above the existing channel and would slope 2 percent toward the channel. The upper slope would be stepped gabions at 1:1 slope. Tree wells would be provided where feasible.	The distance from the top of the east bank to the District ROW would be 5 feet.
	Construct maintenance road and access ramp	18-foot maintenance road would continue from Reach 10C under Capitol Expwy. and would be located on the floodway bench. A ramp would be provided upstream of Capitol Expwy. Bridge to provide access to the top of the bank. The bypass channel would also be provided access from Steval Place.	
	Revegetation	Revegetate on the barren areas of existing west bank. Also, tree wells would be constructed in gabions where feasible.	
11B (Bryan Avenue to Ross Creek)	Widen the west channel	Widen west bank with cribwalls at 1:6 side slope to create a 40-foot wide bench 6 feet above the existing channel bottom. Construction along Almaden Expwy. would be coordinated with the Santa Clara County Transportation Department.	Relocate SJWCo well and piping; coordinate with the SJWCo Remove two homes Relocate utilities, coordinate with the City of San Jose
	Remove a low-flow crossing	Remove an abandoned SJWCo concrete low-flow crossing that is a barrier to fish.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
11B (cont.)	Construct maintenance road and access ramps	The depressed maintenance road from Reach 11A would continue on the east top of bank to the SJWCo property. A ramp would provide access to the bottom of the existing channel. An 18-foot wide depressed maintenance road would provide access to the proposed revegetation area along the west bank. Access ramps would be provided from Almaden Expwy.	
	Revegetation	Revegetate on the depressed bench and the west top of bank. Top of cribwalls would be revegetated where possible.	
11C (Ross Creek to Branham Lane)	Widen the west bank	Widen the bank to a 1:6 cribwall slope and create a depressed bench for floodways and revegetation. The bench would be sloped 2 percent toward the existing channel. Construction along Almaden Expwy. would be coordinated with the Santa Clara County Transportation Department.	Relocate a parking area associated with a commercial building. Relocate utilities; coordinate with the City
	Improve culverts at Ross Creek confluence	An 80-foot extension to the existing culvert at Ross Creek. Addition of a 20 by 10 foot culvert under Almaden Expwy. A gabion apron and stepped-pool for fish passage would be constructed at the culvert outlet.	The fish passage would not be put in operation until DF&G would give go-ahead.
	Construct access ramps	Ramps would be constructed from existing maintenance roads along the east and west banks to provide access to Branham Lane.	
	Revegetation	Revegetate on bare areas on District property south of Ross Creek confluence.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
12 (Branham Lane to Blossom Hill Road)	Widen channel	The River channel between Chynoweth Avenue and Blossom Hill Road would be widened. The east bank would accommodate a depressed maintenance road; while the west bank would allow for a depressed revegetation bench.	
	Raise levees	Existing levees on the east and west banks would be rebuilt and raised. An 18-foot wide floodway on the east bank would be created with earth banks of 2:1 slopes. The bench would slope 2 percent towards the channel.	
	Construct maintenance roads and access ramps	Maintenance roads would be constructed on the top of the east and west banks between Chynoweth Avenue and Blossom Hill Road. Ramps would be constructed from existing maintenance roads along the east bank, between Branham Lane to SR 85 overpassing, to provide access under the Branham Lane Bridge.	
	Create perc. pond and wetland habitat	Excavate 7 to 25 feet of soil on land adjacent to the river to create a 4.7 acre off-stream perc. pond. Connected to this would be a wetlands area.	
	Construct Chynoweth Avenue Bridge	Construction would be coordinated with the City.	
	Revegetation	Revegetate banks and levees from the SR 85 overpass to Blossom Hill Road. A depressed bench along the west bank between Chynoweth Avenue and Blossom Hill Road would be revegetated.	
Reach 13	Construct a stepped pool fish passage over existing 15-foot structure.	Stepped pools would be constructed at the drop structure adjacent to the District's Administration Building for fish passage. The system would allow fish passage all year.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
Canoas Creek	Construct flood wall on both banks	3 to 4 feet high	
	Construction of access ramps	Approximately 2 feet inside District right-of-way (ROW).	
	Construct new culvert at Almaden Expwy.	A 20 by 12 foot RCB culvert would be constructed north of the existing double 10 by 12 foot RCB culvert under northbound Almaden Expwy. Provide access onto Almaden Expwy. and Nightingale Drive.	
	Construct culvert at Nightingale Drive	A 9 by 9.5 foot reinforced concrete box culvert would be constructed north of the existing double 9 by 9.5 foot culvert at Nightingale Drive. Construction would be coordinated with the City.	
	Improve culvert inlet and outlet transitions to accommodate new culverts	A 9 by 9.5 reinforced concrete box culvert would be constructed north of the existing double 9 by 9.5 foot culvert at Nightingale Drive. Existing headwalls would be extended to 4 feet above design water surface.	
Ross Creek	Widen channel from Almaden Expwy. to 700 feet upstream of Jarvis Avenue	North bank widened to within 2 feet of the existing ROW. Banks would be lined with articulated concrete mat with 1:1 slopes.	
	Construct new culvert at Almaden Expwy.	A 20 by 10 foot RCB culvert with low flow channel and baffles, located north of existing culvert at Almaden Expwy. Construction would be coordinated with the Santa Clara County Transportation Department.	

TABLE 3.4 (continued)

Reach	Proposed Modification	Specifications	Other Requirements
Ross Creek (cont.)	Construct new culvert at Jarvis Avenue and improve culvert inlet/outlet transitions to accommodate new culverts	A 13 by 9.5 foot RCB culvert with low flow channel and baffles, located north of existing culvert at Jarvis Avenue Construction would be coordinated with the City.	
	Construct a fish ladder at mouth of Ross Creek	Washington-style baffles in the new RCB culverts and stepped-pool design downstream of new RCB culvert. The low-flow channel would be filled in until DF&G made a decision on whether or not fish should migrate in Ross Creek.	
	Relocate sanitary sewer in Almaden Expwy.	Coordinate with the City.	

Reach 6: I-280 to Southern Pacific Railroad (SPRR) - Gabion Bypass Channel

The natural stream channel would remain undisturbed except at erosion sites and at the outlet of the bypass channel. A parallel bypass channel lined with stepped gabions (wire mesh baskets filled with rocks) would be constructed to the east of the Guadalupe River. Construction of the bypass channel would require the removal of McLellan Avenue in this area and the modification of the West Virginia Street and Harliss Avenue and McLellan and Edwards Avenue intersections. The construction would necessitate the removal of 54 homes and one partial backyard area. Existing utilities would be relocated at the District's expense. The bypass outlet structure would be located upstream of Highway I-280. The bypass channel would be about 15 feet deep with a bottom width of 85 feet and 1:1 (1 foot horizontal to 1 foot vertical) side slopes. Low growing vegetation would be allowed but woody growth would be removed from the bypass bottom as part of an ongoing maintenance program. A new bridge would be constructed for the West Virginia Street crossing of the bypass channel. A continuous maintenance road would be constructed at the top of the bank between the existing creek and the bypass and at the bottom of the bypass on the east. Ramps would provide access to the bypass channel bottom.

Upstream of West Virginia Street, the bank between the bypass channel and the Guadalupe River would be lowered 8 feet for a length of approximately 800 feet. During high flows, this low bank would be submerged, connecting the Guadalupe River and the bypass channel. The lowered bank area would be revegetated.

Excavation for SR 87 has made the west bank into a levee. The existing top of the bank is low and needs 3.5 feet of freeboard to meet minimum Federal Emergency Management Agency (FEMA) requirements. The District would raise the levee to provide the required freeboard. A 12-foot wide maintenance road would be constructed on top of the levee. A soils investigation would be performed on the existing levee prior to the preparation of construction plans. If the levee is unstable, it would be reinforced. Levee reinforcement would be performed so as to avoid impacts to riparian vegetation.

The remainder of the existing stream channel would remain intact and the vegetation allowed to grow with a minimum of future maintenance. Access would be from ramps at West Virginia Street. Erosion sites in the existing creek would be repaired as required, following guidelines in the District's maintenance program (Appendix C).

Reach 7: Southern Pacific Railroad to Union Pacific Railroad (UPRR) - Gabion Bypass Channel

The natural stream channel would remain undisturbed except for repair at erosion sites. This alternative would convey the one percent flood flow using an open bypass channel with stepped-gabions. The bypass alignment would follow parallel and to the east of the existing Guadalupe River. The stepped-gabion bypass would have 1:1 side slopes and a bottom width varying from 30 to 85 feet. The gabion bypass channel from Alma Avenue to the UPRR (through the Elk's Lodge property) would have a 7-foot high floodwall on the east bank. Parking area losses will be replaced in coordination with the Elk's Lodge. A new bridge

would be constructed for the Willow Street crossing of the bypass channel. Existing utilities would be relocated by the District or affected utility company. An agreement between the District and the utility company would be negotiated. Relocating the sanitary sewer siphons at Willow Street would be coordinated with the City.

Vegetation would be preserved in the existing channel. Minimum maintenance would be required in the existing channel while the bypass channel would require a moderate level of maintenance. Construction of the bypass would require the relocation of 13 commercial businesses between Lelong Street and the Guadalupe River near Willow Street and an easement at the Elks Lodge.

The bank between the existing channel and the proposed bypass channel would be lowered 10 feet from Willow Street to Alma Avenue. These lowered banks would be submerged during high flows, thereby connecting the Guadalupe River and bypass channel. The lowered banks would be revegetated. A floodwall would be constructed along Lelong Street from Alma Avenue downstream for 300 feet.

Maintenance ramps would be constructed periodically along the east bank of the proposed bypass channel for access to the maintenance road on the channel bottom. An access road would also run along the bottom of the proposed bypass channel between the SPRR and Willow Street. Access to the Guadalupe River would be from ramps at Willow Street and Alma Avenue.

A soils investigation would be performed on the existing west bank levee downstream of Alma Street prior to the preparation of construction plans. If the levee is unstable, it would be reconstructed.

Erosion is active on the west bank between Willow Street and Alma Avenue A new erosion site (450 feet long) was observed upstream of Willow Street after the January and March 1995 floods. Specific measures to repair and protect this site would follow the maintenance program included in Appendix C. Potential methods could consist of an integrated stabilization system using rock boulders, root wads, soil, and live cuttings.

Reach 8: UPRR to Willow Glen Way - Gabion Bypass Channel

The natural stream channel would remain undisturbed except for repair at erosion sites. A parallel, gabion-lined trapezoidal bypass channel to carry peak flood flows would be constructed to the east of the existing Guadalupe River. The bypass channel would have an 85-foot wide bottom and 1:1 side slopes with stepped gabions. The proposed alignment for this reach would require the removal of 23 homes on the west side of Mackey Avenue.

The intersection of Mackey Avenue, Willow Glen Way, and Northern Avenue would be improved such that Northern Avenue would end at Mackey Avenue, and Mackey Avenue would extend to Willow Glen Way to provide for safer vehicle and pedestrian access. Existing sidewalks and street trees on Mackey Avenue would remain undisturbed.

The inlet to the bypass would consist of a drop structure (190-foot-long gabion weir) just downstream of Willow Glen Way. The weir would be designed so that flow less than

approximately 1,500 cfs would continue in the natural channel. During a one percent flood event, 9,600 cfs would be diverted into the bypass channel, leaving 5,000 cfs in the Guadalupe River.

Maintenance access would be provided by ramps located on the east bank of the bypass channel. These ramps would provide access to the maintenance road at the bottom of the proposed bypass channel. Access to the Guadalupe River would be from the existing west bank maintenance road and ramp.

Reach 9: Willow Glen Way to Curtner Avenue - Widened Gabion/Crib Wall Channel

The west bank of the Guadalupe River would remain undisturbed except for repair of erosion sites. The east bank of the Guadalupe River would be widened up to 60 feet through portions of this reach, creating a bench about 5 to 12 feet above the river bottom. The bench width would vary from 20 to 70 feet and would include a maintenance road. The Willow Glen Way bridge would be replaced with a new 120-foot bridge. The existing pedestrian bridge would be removed and salvaged for the City. Existing wells and associated facilities on the San Jose Water Company (SJWCo) property within the construction area would be relocated. Location of the new wells would be coordinated with the SJWCo in advance of channel construction.

Within this reach, two short bypasses would be created to preserve existing vegetation, thereby creating islands. A 500-foot long bypass channel between Willow Glen Way and Pine Avenue (Pine Bypass) would have an elevation of 9 feet above the existing channel bottom and would have a bottom width of 40 feet and stepped gabions on 1:1 side slopes. A 500-foot-long bypass channel upstream of Malone Road (Malone Bypass) would have an elevation of 5 feet above the existing channel bottom and would have a bottom width of 40 feet. The east bank would be protected with a cribwall on 1:6 slopes. The west bank of the bypass would consist of 1:1 side slopes with stepped gabions. Both bypasses would be designed so that flows less than 1,500 cfs would remain in the natural channel.

The natural bank and vegetation between the stream bottom and the proposed bench elevation would be preserved where possible. A portion of the excavated bench could be revegetated to provide partial mitigation of impacts of vegetation removal above the proposed bench elevation. Maintenance roads would be located along the bench in some areas and the bottom of the bypass channel in others. Maintenance access ramps from the proposed bench road to the channel bottom would be constructed at several locations through the reach.

Removal of six homes, two partial backyard areas, and two businesses would be necessary. Existing utilities would be relocated at District expense. Road construction adjacent to Almaden Road would be coordinated with the City and any necessary repairs or restoration to the roadway would be made by the District.

Two new erosion sites (a total of 500 feet long) were observed downstream of Curtner Avenue after the January and March 1995 floods. Specific measures to repair and protect this site would follow the maintenance program included in Appendix C. Potential methods

could consist of an integrated stabilization system using rock boulders, root wads, soil, and live cuttings.

Reach 10A: Curtner Avenue to Southbound Almaden Expressway - Widened Cribwall Channel

The east bank would be widened, creating a bench varying from 18 to 40 feet wide about 5 feet above the present channel bottom. Slopes would be lined with crib walls on 1:6 slopes. A maintenance road would be constructed along the bench. The east bank widening would remove mature riparian vegetation. All the mature riparian vegetation on the west bank would be preserved. The Curtner Avenue bridge would be replaced with a new 110-foot long bridge.

Reach 10B: Southbound Almaden Expressway to Stream Gage Station 23B - Levee and Revegetation

A levee up to about 4 feet high with a top width of 12 feet and 2:1 side slopes would be constructed on the west bank between northbound and southbound Almaden Expressway to provide required freeboard. At Lincoln Avenue overpass, a 4-foot high floodwall would be constructed for a length of 300 feet, conforming to the levee. A low-flow channel would be constructed by reforming the rock which is already in place.

Upstream of northbound Almaden Expressway, a maintenance road would be established on the existing east bench. Portions of the bench would be excavated to provide a larger revegetation area. Existing rock lining at the channel bottom would be relocated and a low-flow channel would be constructed. A ramp just upstream of Almaden Expressway North Bridge would provide access to the maintenance road.

Previously the weir at Stream Gage Station 23B inhibited fish migration. Water did not crest over the weir directly into the plunge pool, reducing the effectiveness of the plunge pool. Boulders below the water surface near the weir further reduced passage capabilities by reducing pool depth and passage corridors. The District modified the structure in 1995 and enlarged the plunge pool below the weir thereby creating favorable hydraulic conditions for fish passage. The District, with the Preferred Project, would lower the gage station to the channel invert and eliminate potential fish passage problems due to the weir.

Just downstream of Stream Gage Station 23B, Pearl Avenue Bridge would be constructed by the City in coordination with the District and the property owner. It is anticipated that the District will enter an agreement with the City and/or the property owner to cost-share on the new bridge up to the amount which would have been required to replace Hillsdale Avenue Bridge.

Reach 10C: Stream Gage Station 23B to Capitol Expressway - Widened Gabion Channel

Excavation of the east bank would create a bench varying from 20 to 58 feet in width and about 8 feet above the present channel bottom. A maintenance road would be constructed along the bench.

Hillsdale Avenue Bridge would be removed after completion of the Pearl Avenue Bridge proposed by the City in Reach 10B. Between Hillsdale Avenue and the Capitol Expressway, the east bank would be widened. The west bank would remain undisturbed, and barren areas would be revegetated. The east bank above the maintenance road would be lined with cribwalls at a 1:6 slope. The bank below the maintenance road would be lined with stepped gabions. The existing drop in the channel bottom downstream of Hillsdale Avenue consisting of a concrete apron and weir, that acts as a drop structure and fish barrier, would be removed and the channel bottom excavated to create a continuous slope. A low-flow channel would be constructed using rock weirs, root wads, and other stream restoration features.

Land acquisition of commercial and industrial properties would be necessary. Existing utilities would be relocated at District expense. Excavation at Valley View packing plant would begin after the plant has ceased permanent operations. A portion of the depressed bench would be revegetated.

Reach 11A: Capitol Expressway to Bryan Avenue - Bypass and Widened Gabion Channel

Along the entire reach, the west bank would remain undisturbed. The existing trees on the west bank would be preserved, and barren areas would be revegetated. The east bank would be widened from Capitol Expressway to the confluence of the bypass channel.

A 700-foot long bypass channel, with 2:1 side slopes on the west bank for revegetation, would be constructed east of the natural channel from Station 915+00 to 922+00. The bypass channel would be 50 feet wide at the bottom, with a rock-lined invert and partial cribwall treatment (see the Guadalupe River Watershed Planning Study Engineer's Report [Engineer's Report]). The entrance to the bypass channel would be at an elevation such that flows less than approximately 1,500 cfs would continue in the natural channel. The existing natural channel in this section would be undisturbed.

Excavation along the east bank is proposed upstream of the bypass channel entrance to enlarge the existing channel and create a depressed maintenance road on the east bank from 5 to 8 feet above the existing channel bottom. The bank below the bench would be sloped 2:1. The slope above the bench would be gabion-lined and sloped 1:1. Channel widening would increase flow carrying capacity and allow the one percent flood to be contained with freeboard. Existing concrete rubble that acts as a fish barrier would be removed from the channel bottom. Existing vegetation on the west bank would be undisturbed and barren areas revegetated.

Reach 11B: Bryan Avenue to Ross Creek - West Bank Widening with Cribwalls

The west bank would be excavated with a 1:6 side slope lined with cribwalls to create an earth bench up to 40 feet wide, located about 5 feet above the channel bottom to increase channel capacity and provide maintenance access. Maintenance roads would be located on the west bench and east top of bank. An abandoned SJWCo concrete low flow crossing which acts as a drop structure and fish barrier would be removed and the channel bottom excavated at this location. The bench would be revegetated with riparian species.

The project would impact properties on the west bank between the Guadalupe River and Almaden Expressway. Two homes and one SJWCo well would be affected. The houses would be removed to allow for the channel widening. The well and associated piping would be relocated at District expense in coordination with the SJWCo. Existing utilities would be relocated at District expense or per other agreement.

Reach 11C: Ross Creek to Branham Lane - West Bank Widening with Cribwalls

The west bank would be excavated with a 1:6 side slope lined with cribwalls to create a bench about 6 feet above the channel bottom to serve as a floodway and revegetation sites. Some of the existing trees within 11 feet of the channel bottom would be preserved. Some areas now bare would be revegetated along the east bank and on District land at Ross Creek. Maintenance roads would be located at the top of the east bank and on the west bench. The existing east bank has a high quality riparian habitat with many large trees at or near the top of the bank. Existing vegetation on the east bank would not be affected by this alternative.

Where Ross Creek enters the Guadalupe River, the Ross Creek culvert would be extended by 80 feet. The extension would be used to orient the culvert downstream. A concrete apron and stepped pools for fish passage into Ross Creek would be constructed at the culvert outlet.

Necessary right-of-way for this reach would extend 30 feet into an existing commercial parking lot, and a minimum clearance of 20 feet would be provided between the proposed top of bank and the building structure. Existing utilities would be relocated at District expense or per other agreement.

Reach 12: Branham Lane to Blossom Hill Road - Widened Earth Channel with Bench

Reach 12 is nearly adequate to convey the one percent flood. Between Branham Lane and the future Chynoweth Bridge crossing, the west bank would be revegetated. The existing clumps of trees on the west bank would be preserved. Between the seasonal in-stream percolation ponds and Blossom Hill Road, the west bank would be widened 25 feet to the west to create a revegetation bench. The estimated amount of loss of existing off-stream percolation ponds is 3.0 acres. The levees would be reconstructed and raised up to 6 feet on both banks between Chynoweth Avenue and Route 85. Maintenance roads would be located on top of both the east and west banks.

The Branham gravel dam is located 1,000 feet upstream of Branham Lane, and the Blossom Hill gravel dam is located 1,800 feet downstream of Blossom Hill Road. These dams operate at approximately 164 feet mean sea level (MSL) and 171 feet MSL ponded water surface elevations, respectively.

To mitigate impacts of the proposed flood control project on riparian and wetland habitat, the District would create large areas of riparian, wetland, and open water habitat in Reach 12. The plan includes excavating up to 20 feet of soil on land adjacent to the Guadalupe River to create conditions conducive to wetland and riparian habitat development. About 4.7 acres of recharge pond would be created offstream in Reach 12 to replace the loss of existing

off-stream percolation ponds. The existing vegetation on the east and west banks would remain undisturbed except at the levee section.

Reach 13: Blossom Hill Drop Structure - Construction of a Step-Pool Ladder

Construction of a step-pool ladder at the 15-foot Blossom Hill drop structure on the Guadalupe River (Reach 13) is part of the proposed project (see Settlement Agreement below).

Tributaries

Minor modifications to two tributaries of Guadalupe River are proposed as part of this project: Canoas Creek and Ross Creek. The modifications are to control backwater flooding caused by flows in Guadalupe River. The proposed actions and detailed specifications for these flood control modifications are also summarized in Table 3.4.

Canoas Creek: Guadalupe River to the End of Nightingale Drive - Floodwalls

Additional culverts would be installed at Almaden Expressway and Nightingale Drive. Floodwalls up to 3 to 4 feet high would be constructed on both banks between the Guadalupe River and the Nightingale Drive culvert. Floodwalls would be constructed within 2 feet of the District's right-of-way. Access ramps from the existing maintenance road to Almaden Expressway and Nightingale Drive would be constructed. An additional 1,385 feet of floodwall would be constructed on the south bank levee upstream of the Nightingale Drive culvert. No vegetation would be affected on this south bank levee.

Ross Creek: Guadalupe River to 700 Feet Upstream of Jarvis Avenue - Floodwalls

To contain the one percent flow, the culvert at Almaden Expressway and the culvert at Jarvis Avenue would be enlarged. From Almaden Expressway to 700 feet upstream of Jarvis Avenue, the channel would be widened on the north bank to 2 feet from the existing right-of-way. Both banks would be lined with articulated concrete mat at a 1:1 slope, and the existing 18-foot wide maintenance road would remain on the top of the south bank. The existing sanitary sewer pipe under Almaden Expressway would be relocated in coordination with the City. Any existing utilities relocation would be at District expense or per other agreement.

The District would construct stepped fish pools at the mouth of Ross Creek and install Washington-style baffles in the new RCB culverts for future fish passage into Ross Creek. The pools will be temporarily backfilled with rock, which will be removed when fishery habitat in Ross Creek improves in the future and DFG concurs in removal of the rock. DFG (Roper 1996) has indicated that anadromous fish migration into Ross Creek should be discouraged.

Environmental Protection Measures

The District has incorporated several environmental protection measures into the design of the Preferred Project to avoid or minimize impacts on biological resources. Environmental

protection measures include seasonal limitations on construction activities, development of a Storm Water Pollution Prevention Plan, and monitoring and maintaining fish passage. These measures are discussed below.

Limit In-Channel Construction to Summer Low-Precipitation Period

The District will limit all in-channel construction (i.e., that occurring between the top of one bank to the top of the opposing bank) to the summer low-precipitation period (April 15 to October 15) to minimize erosion potential and minimize impacts on spawning, rearing, and egg states of anadromous salmonids. Construction outside this period would require prior approval from the California Department of Fish and Game. Construction in the channel invert or other construction activities requiring stream dewatering, heavy equipment operation in the channel, or stream crossings would be limited to the May 1 to October 15 period, with the stipulation that such activites can commence before June 1 only if field surveys (consisting of a minimum of 3 days of sampling) indicate that no juvenile salmonids are present in the project vicinity and that average daily water temperatures have exeeded 64°F for a minimum of 3 days in a row (generally, conditions for steelhead trout and chinook salmon decline when water temperatures exceed 64°F in spring).

Implement a Storm Water Pollution Prevention Plan

The District would require the contractor to develop and implement a Storm Water Pollution Prevention Plan to minimize the potential for sedimentation of aquatic habitats, including steelhead trout and chinook salmon spawning and rearing habitats. Measures in the plan would include, but not be limited to:

- limiting in-channel construction periods, especially to periods outside adult and juvenile fish migration, from April 15 to October 15 to avoid or minimize the potential for sedimentation of aquatic habitat;
- conducting all construction work according to site-specific construction procedures plans that minimize the potential for sedimentation of aquatic habitat;
- grading spoil sites to minimize surface erosion;
- covering bare areas with mulches and revegetating all cleared areas with native species;
- preventing equipment operation in flowing water when performing in-channel activities by constructing cofferdams and diverting all streamflows around construction sites;
- constructing sediment catch basins across the stream channel immediately below the project site when performing in-channel construction to prevent silt- and sediment-laden water from traveling downstream;
- preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- establishing specifications in construction documents that include strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways;
- cleaning up all spills immediately according to construction specifications and notifying DFG and other appropriate regulatory agencies immediately of any spills and cleanup procedures;
- providing staging and storage areas located outside the stream's normal high-water area for equipment, materials, fuels, lubricants, solvents, and other possible contaminants;
- removing vehicles from the normal high-water area of the stream before refueling and lubricating; and
- preventing operation of equipment in flowing water.

The contractor would have the Storm Water Pollution Prevention Plan prepared before construction begins, as required in construction specifications.

Monitor and Maintain Fish Passage Structures

District staff would periodically inspect and maintain fish passage structures, including removing accumulated trash debris. The design of proposed fish passage structures would be developed in consultation with DFG and the U.S. Fish and Wildlife Service (USFWS).

Construction Schedule

The District proposes to construct Reaches 6 and 12 early in the overall project construction period. Construction of Reaches 6 and 12 provides substantial mitigation for the project. The District expects that the project would require approximately 10 years to construct. However, funding constraints may mean that the overall construction schedule is spread out over almost 30 years: through 2023 with 1- to 4-year gaps between construction (Table 3.5). Because of the uncertain construction schedule, the District has provided interim remediation for partial barriers to fish passage at Stream Gage Station No. 23. See "Settlement Agreement" and "Benefits of the Project" below. If the expected construction schedule is substantially expanded, the District would assess the applicability of this EIR/EIS to ensure that no significant changes to the impacts identified in this document have occurred.

Standard Construction Procedures

Construction of the Preferred Project would involve excavation and backfilling; bridge and ramp construction; installation of cofferdams; installation of pipes, culverts, and gabions; removal and installation of utilities; fence construction; roadway removal and repaving; and vegetation removal and replanting. The District incorporates stormwater Best Management Practices (BMPs), including erosion and sedimentation control and rules for contractor's activities, in construction specifications. A reach-by-reach description of general construction procedures of the Preferred Project is provided in Appendix B.

TABLE 3.5

UPPER GUADALUPE RIVER FLOOD CONTROL PROPOSED CONSTRUCTION SCHEDULE AND COST ESTIMATE

Reach	Scheduled Construction[1]	Total Cost (Million $)
A	1998-1999	1.6
6	1998-1999	19.0
7	1999-2001	21.0
8	2002-2003	10.3
9	2008-2010	13.8
10	2010-2017[2]	13.2
11	2021-2023[2]	10.8
12	1998-1999	18.3
Canoas Creek	2022-2023	1.8
Ross Creek	2017-2018	3.7
13		
Fish Barrier Modifications[2] Upstream of Blossom Hill Road	1998-1999	0.5
PROJECT TOTAL		114

1 Assumptions: (1) no federal funding; (2) benefit assessment continues at current rate beyond year 2000. In the current program for the District Central Zone, the average homeowner pays $30 per year for benefit assessments. That program will "sunset" in 2000 if not continued by the voters.

2 Including fish barrier removal. Interim fish barrier remediation may be provided.

Excess soil generated by the project would be available for use by other agencies and contractors, as coordinated by the District, for use at other construction sites or as landfill cover.

General Construction Procedures for Cofferdams

Cofferdams would likely be needed for most proposed construction. Cofferdams are temporary structures necessary to dewater the creek and allow access across the creek during construction. The estimated total volume of earthen fill for the cofferdams under 404 jurisdiction is 7,000 cubic yards based on the Ordinary High Water line. The area of other waters of the United States to be filled temporarily by these structures is 1.06 acres. Typically, a driving hammer and crane will be operated from the bank of the creek to place the fill. A bypass pipe is used to maintain downstream flows. Materials and the method of placement would be selected to prevent erosion or an increase in surface water turbidity. Upon completion of construction, all material used for the cofferdams would be removed and the bed and banks would be returned to preconstruction contours. Delineated wetlands would be avoided as cofferdam sites. The California Construction Best Management Practice (BMP) would be implemented.

Relatively open locations would be selected for placement of the cofferdams. As a result, overall impact should be minor. The other waters of the United States in the project area would be temporarily impacted during construction of the cofferdams. Since the cofferdams would be removed after construction, no long-term effects are expected. The potential locations of 25 cofferdams are shown on the engineering drawings, available for review at the Santa Clara Valley Water District office.

Routine Maintenance Procedures

The District's proposed maintenance activities and guidelines (including routine flood maintenance, debris removal, vegetation control, and erosion control) are presented in Appendix C. The impact analysis assumes this program will be implemented.

Differences between existing and proposed channel maintenance procedures are minor. The most notable changes under the Preferred Project include less extensive sediment removal, reduced use of sacked concrete for erosion control, application of pre-emergent and post-emergent herbicides on newly constructed roads and ramps, maintenance for new irrigation systems and mitigation plantings, and less mechanical and chemical vegetation control. In general, native vegetation would be removed or restricted in height in a 25-foot wide corridor centered on the existing low-flow channel in Reaches 6 to 12 and a 50-foot wide corridor in Reach A to maintain flood capacity. Vegetation in the channel bottom that is outside the corridors would be trimmed periodically in accordance with the maintenance guidelines (see Appendix C). Native vegetation on the banks would not be removed under this maintenance program.

Mitigation Banking for Future Erosion Repair Projects

Over the last 18 years, erosion repair projects have affected a cumulative length of bank of 2,800 linear feet within the upper Guadalupe River project area. The total area affected by erosion repair was approximately 1.5 acres. The average area affected by erosion repair each year is 160 linear feet and 0.08 acre. Over the 100-year life of the proposed project, some erosion repair will be necessary but the rate of repair would be less than the historic rate of 0.08 acre per year because the proposed bypass channels and gabion lining would be constructed. It is also expected that the use of the proposed maintenance program (Appendix C) will result in significantly less environmental impact at each erosion repair site.

The maintenance program proposes using low-impact erosion control methods first and only using hardscape methods such as sacked concrete slope protection and gunite as a last resort. In many situations where low-impact methods are used, such as willow wattles or root wads, the repair would be a benefit. If rock at the toe of the bank (with soil and seed) is the selected erosion control method, this would armor the toe of the bank, stop sediment input into the creek (sediment is a major nonpoint source pollutant), provide a permeable substrate for new plants to grow, and eventually create an improved creek environment. At the very least, these low-impact erosion control methods would maintain equivalent value to the habitat that was there before the repair. Based on the proposed maintenance guidelines for future erosion repair activities and with completion of the capital improvements, it is anticipated that there could be up to 80 linear feet (0.04 ac) per year which, following the maintenance guidelines, could not be protected except with a hard surface. Constructing a hard surface at erosion repair sites eliminates the potential for reestablishment of streamside vegetation in those areas where the proper conditions (i.e. soil, moisture, lack of disturbance) exist for plant growth. The District, therefore, proposes to establish a riparian and SRA mitigation bank, as part of the preferred project, to mitigate for those erosion repair projects that eliminate the potential for reestablishment of streamside vegetation.

The District is proposing to construct 5.43 acres of riparian mitigation bank. Because this is mitigation for elimination of the potential for vegetation reestablishment, rather than direct loss of vegetation, the overall standard for compensation (whether in-stream or off stream) will be 1 acre restored for 1 acre net loss, unless it can be demonstrated that the restoration site substantially exceeds the functions and values that are being mitigated for. An average annual impact of 0.04 acre of riparian habitat per year over the next 100 years would result in a total impact of 4.0 acres of riparian habitat after 100 years. Because the District is proposing to establish a mitigation bank up front and much of the habitat value will exist prior to expected impacts, the District is assuming that a mitigation ratio of less than 1:1 would be applied to a substantial portion of the potential impacts. The exact mitigation ratio will be determined in consultation with the USFWS and DFG. For planning purposes, the District has assumed a 1:1 mitigation ratio over the next 100 years in its proposal to construct 5.43 acres of riparian mitigation bank, but is expecting to use some of this bank for other projects. The District is also investigating the potential for an additional 0.5 acre in Reach 12 that could be added to the mitigation bank.

The District is also proposing to establish approximately 5,779 linear feet of SRA mitigation bank in excess of the project's construction-mitigation needs. This bank could provide mitigation for over 60 years of erosion repair projects, assuming a 1:1 mitigation ratio for SRA impacts and assuming that an average of 80 linear feet per year of SRA habitat would be affected by erosion repair. The riparian and SRA mitigation banks might also be used to compensate for other District projects. The District will establish guidelines, in coordination with USFWS and DFG, for the operation of the mitigation banks and for accounting for habitat affected and mitigation provided.

The District is currently preparing a maintenance activities program EIR (PEIR) to consider the long-term environmental impacts of its District-wide sediment removal, erosion control, and vegetation management and maintenance programs. The proposed maintenance activities are anticipated to follow a protocol similar to the proposal being developed with the regulatory agencies for the District-wide maintenance program. The District-wide maintenance activities PEIR is intended to provide a framework for District staff to carry out standard maintenance BMPs, impact assessments, and compensatory mitigation. Until the program PEIR is certified, the maintenance portion of the Corps permit for the Guadalupe River is proposed to become part of the District-wide individual permit.

Best Management Practices Protocol

Each maintenance activity would follow a management protocol similar to that illustrated by the Best Management Practices Maintenance Protocol Flow Chart (see Figure 3.4). The flow chart shows that the BMP process covers all three phases of maintenance work: (1) maintenance design, (2) project construction, and (3) monitoring. Under the BMP protocol, the District would evaluate each maintenance project and determine the least environmentally damaging and economically practicable maintenance method.

Impact Assessment

Most District maintenance projects would not have any significant environmental impacts due to the nature of the maintenance activity, low environmental sensitivity of the site, or through the implementation of standard environmental controls. The District would proceed with progressive maintenance measures to first avoid significant impacts to sensitive resources.

Compensatory Mitigation

If the application of BMPs is not sufficient to fully mitigate impacts, compensatory mitigation would be implemented. Since on-site, in-kind mitigation is not possible due to site constraints, mitigation at an off-site location may be necessary. A mitigation bank would be developed to mitigate unavoidable adverse impacts.

Annual Reporting

Annual maintenance reporting would be included with the District's annual report. Upon certification of the District's Maintenance Program EIR and approval by the resource agencies of an individual Corps permit, the District would be able to continue maintenance activities under a largely self-regulating program.

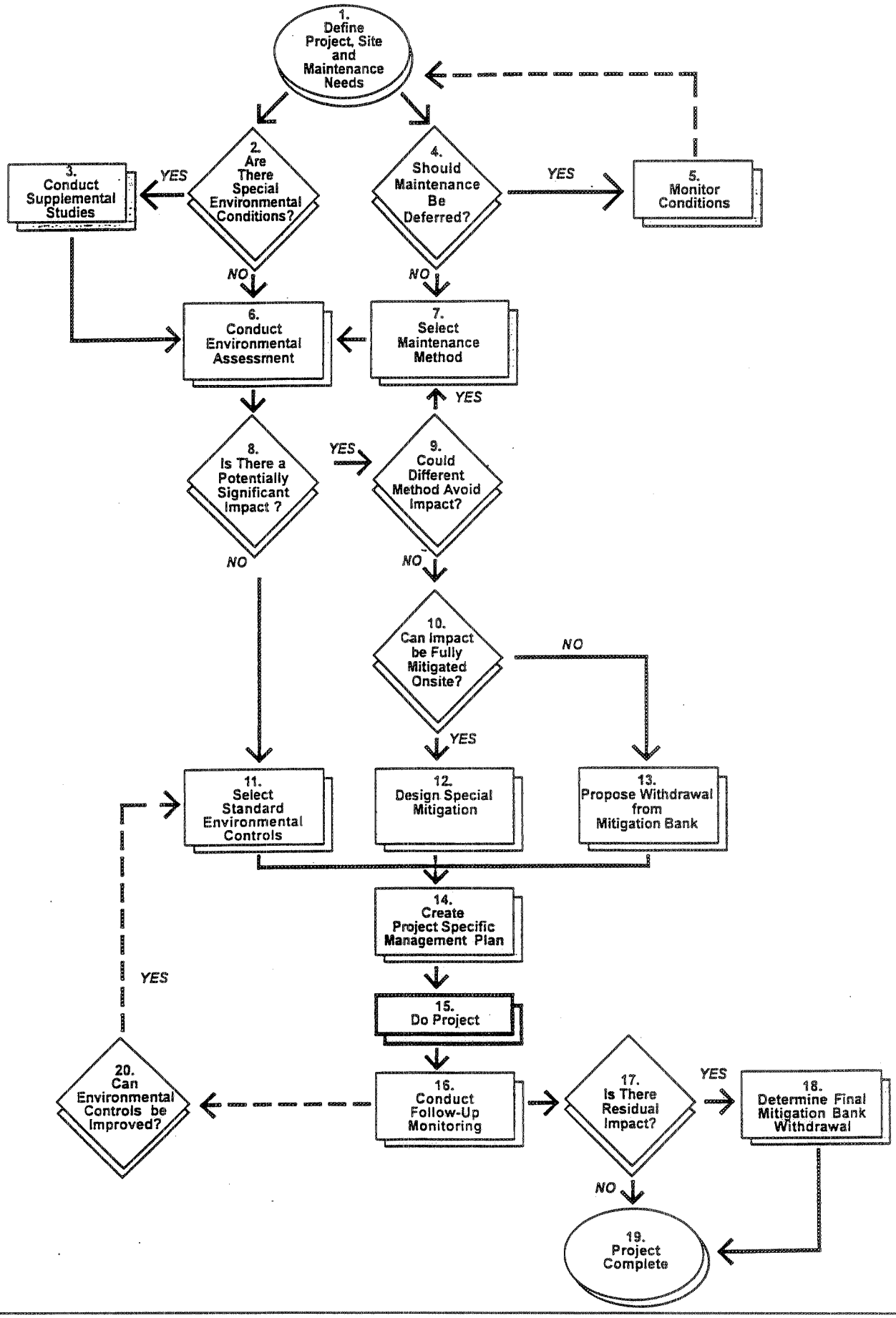


Figure 3.4. Flowchart for the Santa Clara Valley Water District Best Management Practices (BMPs)

Settlement Agreement

The District has recently entered into a settlement agreement in response to a dispute with DFG. The dispute centered around the loss of aquatic life during the summer of 1994 as a result of a dry Guadalupe River in the area of Hillsdale and Minnesota Avenues in San Jose. The agreement stipulates, in part, that from August 8, 1995, until December 31, 1999, the District:

> . . . shall maintain a live stream from the confluence of Alamitos and Guadalupe Creeks downstream to the Santa Clara Valley Water District's Gauging Station 23B by maintaining a flow of at least one cubic foot per second of water at all times at said Gauging Station 23B . . .

In addition, the settlement stipulates that the District:

> . . . shall construct a fish ladder or fishway at the twelve-foot drop structure that exists behind the Santa Clara Valley Water District Headquarters at Alamitos Creek, conforming to engineering and construction specifications approved in writing by the California Department of Fish and Game, to be fully operational by October 15, 1999.

Construction of a step-pool ladder at the 15-foot Blossom Hill drop structure on the Guadalupe River is part of the proposed project. There is no large drop structure at Alamitos Creek. The District has submitted preliminary design drawings for the proposed step-pool ladder at the Blossom Hill drop structure to the DFG.

Property Acquisition and Management

The District has established a voluntary acquisition program whereby properties within the project area that are placed on the market are acquired by the District at market rate. The District has in place a Relocation Assistance and Last Resort Housing Plan, which is available for review at the District office[1] (Santa Clara Valley Water District 1993[a]). The Plan provides a framework to provide for the consistent administration of acquisition, appraisal, and relocation programs by the District and is discussed in greater detail in Section 4.6, Socioeconomics, of this EIR/EIS. The District has two programs: the Relocation Advisory Assistance Program and the Relocation Assistance Payment Program. These programs have been designed to implement the District policy that no person shall be displaced in connection with a District project unless and until adequate replacement housing has been provided.

The District has developed a Property Management Plan that establishes guidelines regarding the renting, demolition, and interim use of properties acquired by the District for future development of the Upper Guadalupe River Flood Control Project. The Property Management Plan establishes a process to determine how each District property would be managed prior to demolition and in the interim period before construction of the project (Santa Clara Valley Water District 1996[a]). The Property Management Plan is available for review at the District office.[1] The District's property management and disposition process is summarized sequentially below.

[1] Santa Clara Valley Water District, 5750 Almaden Expressway, San Jose.

1. District staff determine if the structure acquired is habitable or cost-effective to renovate. If the structure is not a viable candidate for renovation or repair, it will be demolished; if it is habitable or can be repaired, the structure will be retained as a rental property.

2. If the property is rented, the District will select a tenant based on standard District procedures, and will manage the property to assure that it is reasonably maintained and does not disrupt the surrounding community.

3. If demolition is determined necessary, demolition activities would be conducted in accordance with criteria and the implementation of mitigation measures necessary to minimize impacts to the environment and community. Structurally sound buildings removed at the time of project construction will be advertised for sale to be moved off the site. If the structure is not moved, it will be demolished.

4. Interim use of cleared lots, if any, will be determined based on the needs of the community, adjacent landowner, and the District.

Benefits of the Project

This project is designed to provide flood protection on the upper Guadalupe River upstream of Highway 280. The project would have beneficial effects of protecting over 2,176 acres of land from being inundated during the 100-year, or one percent, flood event. Completion of the proposed flood control facilities would protect an estimated 7,200 homes, 230 businesses, 11 public buildings and an estimated 1,390 automobiles from damage. The following schools would be protected from flood hazards by completion of this project: River Glen Elementary, Canoas Elementary, Lincoln Glen Elementary, Washington, Valley View Elementary, and Schallenberger. In addition, it would alleviate the risk of loss of life during major flood events.

Proposed channel modifications would result in beneficial impacts to stream ecology, hydrology, and fisheries. These include removing a concrete apron and weir at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing downstream of Ross Creek (Reach 11B). Both structures are potential barriers to upstream migration by adult salmon and steelhead trout and require high flows for successful fish passage. Only during peak urban storm runoff or prolonged watershed runoff do existing flows allow successful fish passage. Removing the barriers would improve access for migrating fish from the San Francisco Bay upstream to the drop structure above Blossom Hill Road. The District would also modify the weir at Stream Gage Station No. 23B to further improve passage conditions for migrating adult fish (refer to Section 4.14, "Fisheries"). Stepped pools would also be constructed at the Ross Creek confluence and at the drop structure upstream of Blossom Hill Road.

In addition, vortex rock weirs would be constructed in Reaches 9, 10, and 11. These weirs would provide in-stream cover and deepen the feeding areas for fish habitat in the riffle reach of the channel. The weirs act as a grade control structure without upstream lateral migration, bank erosion, and aggradation. They also maintain the low width-to-depth ratio that would reduce the likelihood of bar deposition and maintain the sediment transport capacity of the stream.

The proposed project, mitigation measures, and cumulative impact mitigation would provide an additional 19 miles of available fish habitat. The flood control project is also expected to reduce the frequency and quantity of bank erosion, thereby improving water quality. The proposed mitigation would also provide for a more continuous riparian corridor along the upper Guadalupe River by reducing the number and lengths of gaps in riparian vegetation.

3.4 MINIMIZE VEGETATION IMPACTS ALTERNATIVE

The Minimize Vegetation Impacts Alternative was developed to minimize impacts to the riparian corridor that would be associated with the Preferred Project. Project impacts were determined to be the most substantial in Reaches 9, 10A, Reach 10C, Reach 11A, and 12. Therefore, this alternative proposes channel modifications that would achieve flood protection similar to the Preferred Project, but would be associated with fewer biotic resources impacts. The Minimize Vegetation Impacts Alternative is identical to the Preferred Project in Reach A and Reaches 6, 7, 8, 10B, 11B, 11C, and 13. The Minimize Vegetation Impacts Alternative is different from the Preferred Project in Reaches 9, 10A, 10C, 11A, and 12 as described below.

Under the Minimize Vegetation Impacts Alternative, as described below, an earth bypass would be constructed in Reaches 9 and 10A and 1.5-foot high floodwalls would be constructed on Canoas Creek. A bypass channel would be constructed east of the natural channel in Reach 10C, 500 feet downstream of Stream Gage Station No. 23B, to 150 feet downstream of Foxworthy Avenue. In Reach 11A, a bypass channel would be constructed east of the natural channel. In Reach 12 an earth bypass would be constructed west of the natural channel and the in-stream percolation ponds would be replaced with off-stream ponds. Proposed changes in Reaches 9, 10A, 10C, 11A, and 12 are described below.

Reach 9 and 10A: Willow Glen Way to Canoas Creek

An earth bypass channel would be constructed west of the natural channel, and channel banks would have 2:1 side slopes. A maintenance road would be located on the west top of bank of the natural channel. Ramps would be provided for access into the bypass channel. The bypass would be constructed adjacent to the east side of Creek Drive from Willow Glen Way to Malone Road and adjacent to the east side of Ardis Drive and Coastland Avenue from Malone Road to Curtner Avenue. The bypass would continue adjacent to the east side of El Rio Drive from Curtner Drive to Canoas Creek. The bypass outlet would be constructed at the upstream portion of Reach 8.

Bridges would be constructed at Willow Glen Way, Malone Road, and Curtner Avenue to span the bypass channel.

Construction of the bypass channel would require the removal of 65 structures in Reach 9 and 18 structures in Reach 10A. Existing sidewalks adjacent to the bypass along the east side of boundary streets would be retained, as well as existing street trees. A 42-inch black vinyl fence would be constructed between the trees and the proposed maintenance road on the west bank of the bypass channel. The natural channel would remain undisturbed, except at the diversion inlets. Maintenance activities on the channel banks would include erosion repair,

removal of fallen trees, and control of non-native vegetation. No woody vegetation removal would be required on the channel banks. Vegetation in the channel bottom would be removed when its height exceeds 10 feet.

Construction of the bypass channel also would require the construction of 1.5-foot-high floodwalls in Canoas Creek on both banks between Almaden Expressway and Nightingale Drive for future one percent flood protection in that portion of Canoas Creek.

Reach 10C: Stream Gage Station No. 23B to Capitol Expressway

A bypass channel would be constructed east of and parallel to the Guadalupe River from 500 feet downstream of Stream Gage Station No. 23B to 150 feet downstream of Foxworthy Avenue. The invert of the bypass channel at the confluence would conform to the existing depressed bench in Reach 10B. The 18-foot wide maintenance road from Reach 10B would continue on the bypass channel invert. The bypass channel would be 18 feet deep and 60 feet wide and lined with stepped gabions at a slope of 1:1. Tree wells would be provided in the gabions, where feasible. The right-of-way required would be approximately 300 feet east of the centerline of the Guadalupe River, a total area of 7 acres.

The natural stream channel would remain undisturbed except at erosion sites, which would be repaired as needed. The maintenance program would allow low-growing vegetation in the bypass, but would remove woody vegetation. No vegetation on the existing stream channel banks would be removed. Removal of vegetation in the channel bottom would be required when vegetation height would exceed 10 feet.

Upstream of the bypass channel inlet to Hillsdale Avenue, the east bank would be excavated and a bench for a 60-foot floodway and a 40-foot revegetation area would be created 8 feet above the existing channel bottom. The west bank and lower east bank would remain as existing, leaving the vegetation undisturbed. The upper east bank would be protected with stepped gabions with a 1:1 slope and tree wells would be provided in the gabions, where feasible. An 18-foot wide maintenance road would be located within the floodway at the toe of the upper slope. Ramps would provide access from Hillsdale Avenue to the channel.

From Hillsdale Avenue to Capitol Expressway, the east bank would be excavated. The west bank would remain undisturbed, and barren areas would be revegetated. An 18-foot wide maintenance road would be located within the floodway. The bank above the maintenance road would be lined with cribwall with a 1:6 side slope. The bank below the road would be gabion lined.

The Hillsdale Avenue Bridge would be removed, and a bridge at Pearl Avenue would be constructed. The removal of Hillsdale Avenue Bridge would be coordinated with the City and would be removed only after the Pearl Avenue Bridge is constructed.

A concrete weir and apron downstream of Hillsdale Avenue that acts as a drop structure and fish barrier would be removed. Fish passage at Stream Gage Station No. 23B would be improved.

Reach 11A: Capitol Expressway to Bryan Avenue

An earth bypass channel would be constructed east of the natural channel from Capitol Expressway to Bryan Avenue. The bypass channel would have a 90-foot bottom width and a side slope of 2:1. Maintenance access to the bypass channel would be provided by ramps from Wellington Square.

Construction of the bypass channel would require the removal of 32 structures. The natural channel would be undisturbed, except at the inlet and outlet of the bypass channel. The maintenance activities on the channel banks would include erosion repair, removal of fallen trees, and control of non-native habitat. No woody vegetation removal is required on the channel banks. Vegetation in the channel bottom would be removed when its height exceeds 10 feet.

The existing concrete rubble in the channel bottom at about 600 feet upstream of Capitol Expressway that acts as a fish barrier would be removed. Maintenance activities would include removal of dying or fallen trees and control of non-native habitat. No woody vegetation removal is required on the channel banks. Vegetation in the channel bottom would be removed when the height of vegetation exceeds 10 feet.

Reach 12: Branham Lane to Blossom Hill Road

An earth bypass channel would be constructed west of the natural channel from the Branham Lane seasonal dam location to the future Chynoweth Avenue Bridge. The bypass channel would have a 40-foot bottom width and a side slope of 2:1. A maintenance road would be located on the top of bank between the natural and bypass channels.

From the future Chynoweth Avenue Bridge to Blossom Hill Road, the west bank would be widened 25 feet to the west to create a revegetation bench. The estimated loss of existing off-stream percolation ponds is 3.0 acres. The levees would be reconstructed and raised up to 6 feet on both banks of the channel. Maintenance roads would be located on top of the east and west banks.

Operation of the Branham and Blossom Hill seasonal dams would be discontinued, and the in-stream percolation ponds would be replaced with off-stream ponds. The loss of in-stream percolation ponds is estimated at 14.0 acres.

To mitigate the impacts of the proposed flood control project on riparian and wetland habitats, the District would create large areas of riparian, wetland, and open water habitat in Reach 12. The plan includes excavating up to 20 feet of soil on land adjacent to the Guadalupe River to create conditions conducive to wetland and riparian habitat development. About 18.5 acres of off-stream recharge ponds would be created in Reach 12 to replace the loss of in-stream and off-stream percolation ponds.

Both banks of the natural channel from Branham Lane to Blossom Hill Road could be revegetated. The existing vegetation on the east and west banks would remain undisturbed except at the diversion inlets and levee section.

3.5 NO PROJECT ALTERNATIVE

The No Project Alternative would involve no channel widening, bypass channels, or other structural measures to reduce the current risk of flooding. Ongoing operations and maintenance practices (e.g., vegetation removal and weed control) would continue. The potential for serious flood damage and erosion would continue. Some flooding would be expected to occur once every 4 years, on the average. Ongoing erosion would be expected to continue, with possible damage to adjacent properties and trees.

During a one percent floodflow, approximately 2,200 acres would be flooded and approximately 7,200 residences, 230 businesses, and 11 public buildings would be expected to sustain damage. Estimated cost of damage in the event of a one percent flood would be $280 million. Flood damages are estimated to be an average of $20.6 million per year. Mandatory flood insurance would continue in the flood hazard area. Flood proofing of new development would also be required.

The present worth cost of the flood damage is approximately $280 million and includes annual flood damage, erosion repair, emergency maintenance, flood insurance, and flood proofing of new development (Santa Clara Valley Water District 1997). The District's existing maintenance program includes selected vegetation removal to achieve some flood protection and ongoing erosion repair projects. However, the program applies only to those sections of the Guadalupe River where the District has right-of-way and access to those sites. Ongoing maintenance and erosion control efforts would continue in these areas under the No Project Alternative. However, a comprehensive solution to regional flooding and erosion problems would not emerge under the No Project Alternative.

3.6 IDENTIFICATION OF ENVIRONMENTALLY SUPERIOR ALTERNATIVE

The State CEQA Guidelines and Federal NEPA statutes require that a range of reasonable alternatives to the proposed project, which could feasibly attain the objectives of the project, be described and evaluated in a comparative fashion. The CEQA Guidelines also require that the environmentally superior alternative (including consideration of the proposed project) be identified. If the alternative with the least environmental impact is the No Project Alternative, then one of the other remaining alternatives is to be designated as the environmentally superior alternative.

Environmentally Superior Alternative

Based on the analyses of potential environmental impacts, the Minimize Vegetation Impacts Alternative has been determined to be the environmentally superior alternative (Table 1.3). The Minimize Vegetation Impacts Alternative would have fewer impacts to riparian vegetation and would result in fewer impacts to fish and wildlife that depend on the unusual aquatic and riparian habitat along the Guadalupe Corridor. The Minimize Vegetation Impacts Alternative would be associated with significantly greater socioeconomic impacts that would result from increased loss of housing in the Bypass channel alignment. However, social and economic effects are not considered to be environmental impacts under CEQA.

The Minimize Vegetation Impacts Alternative would be associated with slightly increased construction-related noise, air quality, and traffic; however, these impacts would be temporary and are not considered to be significant. Therefore, the Minimize Vegetation Impacts Alternative is considered to be the environmentally superior alternative.

While eliminating the majority of the adverse impacts to riparian vegetation and wildlife, the No Project Alternative would not achieve the goals of the project to alleviate flooding. The Minimize Vegetation Impacts Alternative would eliminate the large majority of biotic impacts associated with the project, but would be associated with socioeconomic impacts from displaced housing and construction-related traffic impacts on Almaden Road. Under CEQA, socioeconomics are not considered environmental impacts and short-term traffic impacts are generally not considered to be significant effects. Therefore, the Minimize Vegetation Impacts Alternative would best meet the objectives of the project while minimizing environmental impacts and is considered to be the environmentally superior alternative under CEQA.

CHAPTER 4

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

CHAPTER 4

AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

4.1 GEOLOGY, SOILS, AND SEISMICITY

Affected Environment/Setting

Geology

The Guadalupe River Flood Control project is contained within the natural and historical boundaries of the Guadalupe River bed and its tributaries. The Guadalupe River flows through the central portion of the San Jose plain, a structural depression bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. This structural depression is filled by thick sequences (up to 1,500 feet in places) of Plio-Pleistocene and Quaternary unconsolidated alluvial fill. The alluvial fill was washed into the valley from the mountains to the east and west. The fill sources are composed of sandstones, shales, cherts, basalts and serpentinites.

Deposition was largely controlled by climatic conditions and rate of sedimentation along with fluctuations in sea level, forming an interbedded sequence of discontinuous, heterogeneous fluvial deposits and continuous, relatively homogeneous estuarine clays and silts. The fluvial deposits associated with the Guadalupe River can be locally coarse-grained and are generally more continuous in directions parallel to the axis of flow. Older Guadalupe River channel deposits vary locally from the current course of the River. The pre-existing coarse-grained or poorly graded sediments which were deposited by the ancestral Guadalupe River are sometimes incised by the current river channel.

Figure 4.1-1 is a geologic map of the area illustrating the surficial extent of the various geologic units. The alluvial deposits (labeled on the geologic map) predominantly consist of unconsolidated well-graded, interbedded fine sands and silts with some gravel. The section of alluvial fill deposits within the valley floor constitute the groundwater basins of the County. The sands of this unit are considered good potential groundwater aquifer. Riverine deposits (labeled Qyfl) are located at the outer edge of the alluvium and are composed of unconsolidated fine-grained, poorly graded sands, silts, and clays. These strata form large, laterally discontinuous aquifers except where deposition parallels the trend of the stream. A series of organic estuarine silts and clays (Bay Mud) is interbedded with channel deposits. These clays and silts act as aquitards, providing a barrier to groundwater flow between the aquifers.

Soils

The Guadalupe River flows through terrain composed of three soil associations: the Sunnyvale-Castro-Clear Lake (Reaches A,12), the Clear Lake-Campbell (Reaches A, 10, 11), and the Yolo (Reaches A,6-12) as illustrated in Figure 4.1-2 (USDA, 1968). These soil associations, as mapped by the U.S. Department of Agriculture, Natural Resources Conservation Service (formerly Soil Conservation Service), generally refer to the upper 60 inches of material. The Sunnyvale-Castro-Clear Lake Association (SCCA) consists of poorly-drained, calcareous silty-clay soil and calcareous clay subsoils. These soils have very low permeabilities, high runoff rates, high shrink-swell potential, and a moderate erosion potential. The Clear Lake-Campbell Association (CCA) consists of poorly-drained, silty clay surface soils and clayey loam subsoils. Both soil horizons have low percolation rates, moderate to high shrink-swell capacity, and low erosion potential. The Yolo Association (YA) consists of well-drained, coarsely textured silty loam soils and loam subsoils. This association has high percolation rates, low runoff rates, low shrink-swell capacity, and low erosion potential.

Seismicity

Figure 4.1-3 shows the location of major regional fault zones: the San Andreas Fault Zone to the west and the Hayward and Calaveras Fault Zones to the east. The maximum probable earthquake on the San Andreas Fault is considered to be a magnitude 8.3, while on the Hayward and Calaveras Faults, the maximum credible earthquakes are considered to be magnitudes 7 and 7.3 respectively. Smaller potentially active faults exist on the margins of the San Jose Plain and are not expressed at the surface. These less significant faults are the Silver Creek, Evergreen, Piercy, and Shannon. Table 4.1-1 describes the key fault characteristics, such as their activity status, the maximum credible quake magnitude, and their distances from the Guadalupe River.

Earthquakes produce ground shaking and can cause liquefaction or ground failure in surface materials. These hazards can cause erosion and compromise river bank stability. Ground shaking poses the greatest threat because this effect is the most widespread and is common to every earthquake. The potential for given a material to be affected depends on its physical properties and its proximity to the epicenter. Unconsolidated, saturated fine sands and silts as well as unconsolidated moist-wet clays experience the greatest amplitude and acceleration of ground shaking. Ground acceleration can be expected to reach levels of .5g (gravity) in response to a maximum quake on the Hayward or Calaveras faults and .5 to .7g in response to a maximum quake on the San Andreas.

Saturated fine sands and silts are also susceptible to liquefaction in response to ground shaking. These types of deposits are common in the flood plain of the Guadalupe River. Should a major seismic event occur during a wet season when the water table is elevated, the risk of liquefaction would substantially increase.

Figure 4.1-4 illustrates the relative seismic stability of geologic units within the study area. Under dry conditions, with the groundwater table is a minimum of 20 feet below the surface, a majority of the sediments and surface deposits along the Guadalupe River have low to moderate potential for liquefaction and ground failure in the event of a large earthquake.

FIGURE 4.1-1

GEOLOGIC MAP

Guadalupe Flood Control Project

LEGEND

Qb = QUATERNARY BAY MUD

Qyf = QUATERNARY YOUNGER ALLUVIUM

Qyfl = QUATERNARY FLUVIAL

Qof = QUATERNARY OLDER ALLUVIUM

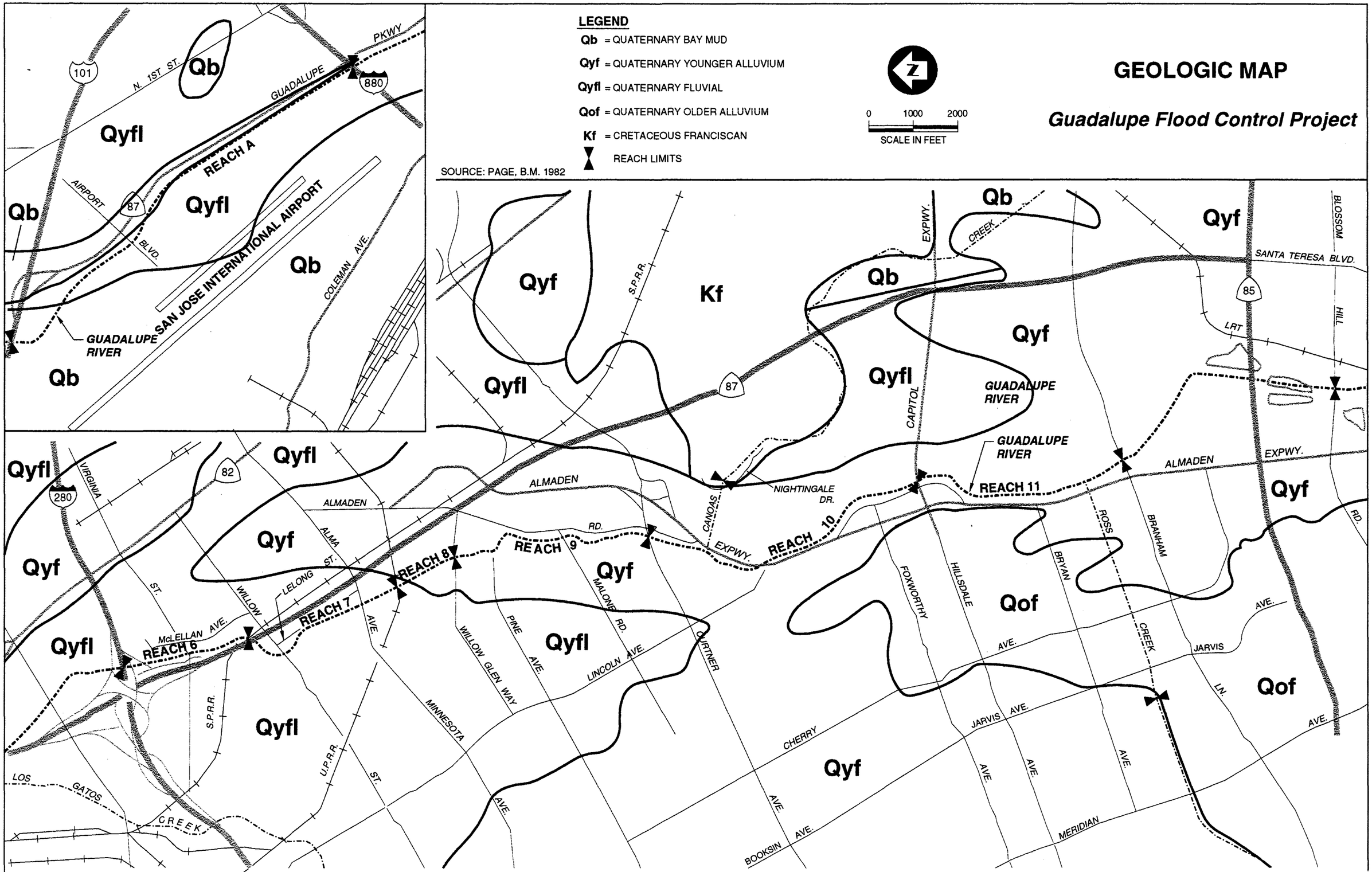
Kf = CRETACEOUS FRANCISCAN

REACH LIMITS

0 1000 2000

SCALE IN FEET

SOURCE: PAGE, B.M. 1982



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SOILS MAP

Guadalupe Flood Control Project

LEGEND

REACH LIMITS

ASSN = ASSOCIATION

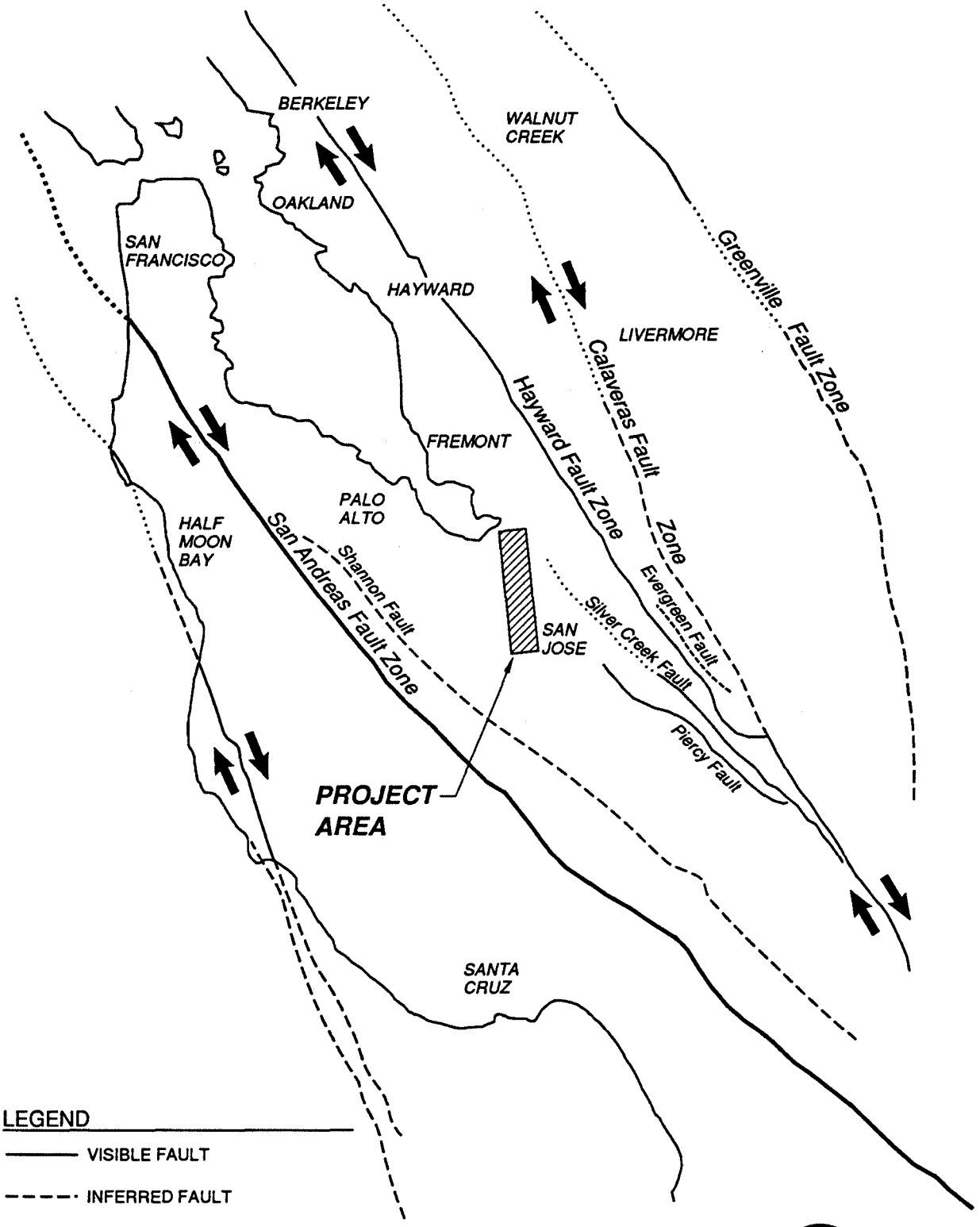
0 1000 2000
SCALE IN FEET

SOURCE: USDA SOIL CONSERVATION SERVICE, 1968

ORESTIMBA-WILLOWS ASSN
CLEAR LAKE-CAMPBELL ASSN
SUNNYVALE-CASTRO-CLEAR LAKE ASSN
YOLO ASSN
MONTARA ASSN
ARBUCKLE-PLEASANT ASSN
N. 1ST ST.
GUADALUPE PKWY.
AIRPORT BLVD.
SAN JOSE INTERNATIONAL AIRPORT
COLEMAN AVE.
GUADALUPE RIVER
S.P.R.R.
CANOAS CREEK
CAPITOL EXPWY.
NIGHTINGALE DR.
BLOSSOM HILL
SANTA TERESA BLVD.
LRT
EXPWY.
ALMADEN EXPWY.
VIRGINIA ST.
ALMA
LELONG ST.
WILLOW ST.
McLELLAN AVE.
MALONE RD.
WILLOW GLEN WAY
PINE AVE.
LINCOLN AVE.
CURTNER
FOXWORTHY
HILLSDALE
BRYAN
ROSS
BRANHAM
CREEK
JARVIS AVE.
MERIDIAN
BOOKSIN AVE.
LOS GATOS CREEK
U.P.R.R.
MINNESOTA AVE.
REACH A
REACH 6
REACH 7
REACH 8
REACH 9
REACH 10
REACH 11
101
880
87
280
82
85

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ENGINEERING-SCIENCE



SOURCE: B.M. Page 1982, CDMG, SP62

REGIONAL FAULT MAP

Guadalupe Flood Control Project

TABLE 4.1-1

DISTANCES, MAXIMUM CREDIBLE EARTHQUAKES, CREEP RATES AND ACTIVITY RATINGS OF POTENTIAL SIGNIFICANT FAULTS IN THE PROJECT AREA

Fault Zone	Distance from Project Area (miles)	Maxiumum Credible Magnitude (Richter)	Creep Rates (mm/yr)	Activity Classification	References
San Andreas	15	8.3	12.2±3.9	Active[a]	Page 1982, Working Group on California Earthquake Probabilities 1990
Calaveras	14	7.3	5.3	Active[a]	Greensfelder 1974, Working Group on California Earthquake Probabilities 1990
Hayward	8[b]	7.0	6.0[c]	Active[a]	Slemmons & Chang 1982
Silver Creek	10	6.2	____[d]	Potentially[e] Active	Cooper Clark 1974
Evergreen	6	____[d]	____[d]	Potentially[e] Active	Rogers & Williams 1974
Piercy	10	____[d]	____[d]	Potentially[e] Active	Rogers & Williams 1974
Shannon	6	____[d]	____[d]	Potentially[e] Active	Rogers & Williams 1974

a Active = Holocene (≤ 11 thousand years) offset

b The portion of the Hayward Fault near the project area is not active.

c In Alameda County

d None given

e Potentially active = Quaternary (≤ 3 million years offset)

LEGEND

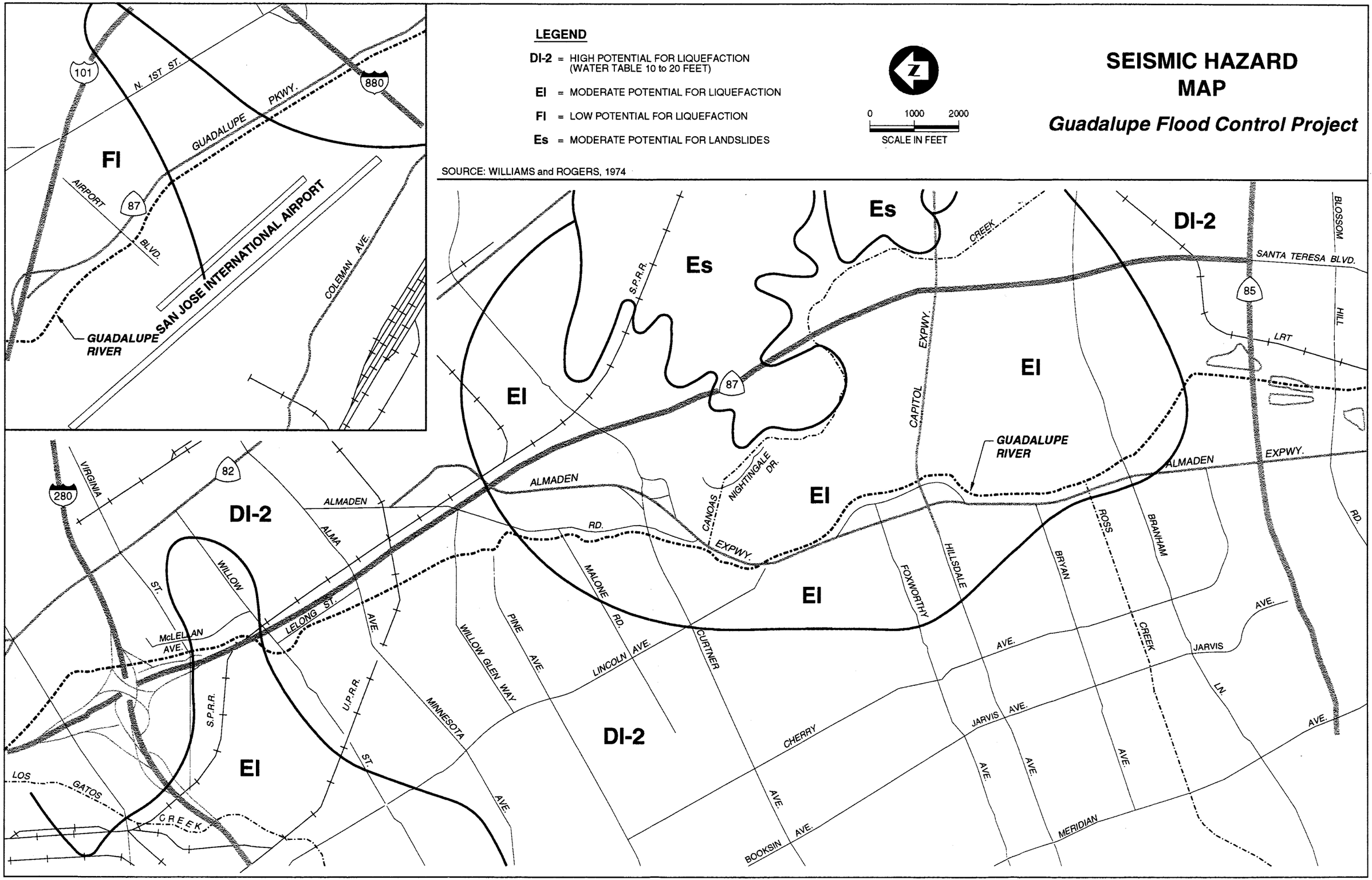
- **DI-2** = HIGH POTENTIAL FOR LIQUEFACTION (WATER TABLE 10 to 20 FEET)
- **EI** = MODERATE POTENTIAL FOR LIQUEFACTION
- **FI** = LOW POTENTIAL FOR LIQUEFACTION
- **Es** = MODERATE POTENTIAL FOR LANDSLIDES

0 1000 2000
SCALE IN FEET

SEISMIC HAZARD MAP

Guadalupe Flood Control Project

SOURCE: WILLIAMS and ROGERS, 1974



Earthquakes may also induce slope failure. The most vulnerable locations within the project area are steep river banks. Stream bank erosion or failure may result from landsliding or liquefaction-induced lateral spreading.

ENVIRONMENTAL CONSEQUENCES/IMPACTS AND MITIGATION MEASURES

Significance Criteria

According to the CEQA Guidelines, exposure of people or structures to major geologic hazards is considered a significant adverse impact. For the purposes of this DEIR, significant geologic hazards would pertain to soil and/or seismic conditions so unfavorable that they could not be overcome by special design using reasonable construction and/or maintenance practices.

Preferred Project

The Preferred Project construction activities such as channel widening, bypass construction and other related activities would result in removal, compaction and covering of soils where grading and construction is planned. Seismically-induced impacts, by contrast, would be regional in nature. Seismically-induced ground shaking, liquefaction, ground failure, and earthquake-induced flooding are potential hazards which could cause erosion and compromise bank stability.

Major earthwork activity would take place in every reach of the channel, in the form of bypass construction, channel widening and construction of new bank slopes. Substantial volumes of excavated soil and sediments would be exposed to water erosion which could contribute to excessive downstream sedimentation. Impacts due to soil erosion would be mitigated by the development and implementation of a Storm Water Pollution Prevention Plan, as outlined in Mitigation Measure WQ-1.

Construction Impacts

Impact G-1: Ground Movement During Shoring. The installation of shoring at excavations could result in ground movement. Bulging or lateral movement of shoring would allow soil behind walls to slump toward the wall, causing lateral movement of the soil and settlement of the ground. The magnitude of both lateral and vertical ground movement would depend on the design and type of shoring system.

Impact G-2: Soil Densification Due to Pile Driving. Installation of driven piles for the shoring system would result in vibrations in the surrounding ground. In loose to medium dense sandy soil, the vibrations tend to densify the soil and cause ground surface settlement. Artificial sandy fill, such as backfill used for utility lines, may be susceptible to vibration-induced settlement.

Operational Impacts

Impact G-3: Slope Instability. The material that forms the river bank is predominantly unconsolidated sands and silts. These slopes generally have a maximum angle of stability of 33 percent. Oversteepening and/or saturation of these sediments (during high groundwater conditions or during flooding) could cause slope instability and trigger failure of the river bank. The increased water content in the sediments would lessen the forces of friction holding the material together and increase the percentage of overburden weight placed on the water-filled spaces. The combination of decreased friction and increased fluid pressure could lead to decreased shear strength and ultimately to ground failure.

Impact G-4: Seismically-Induced Slope Failure or Ground Failure. Ground failure may also be triggered by earthquake-induced groundshaking. Strong groundshaking in saturated granular material (fine sands and silts) can result in liquefaction, lateral spreading, ground cracking, and accompanying structural damage. In unsaturated, oversteepened sediments, seismic activity may trigger landslides. At the project site, steep channel banks with slopes greater than 2:1 would be most susceptible to slope failure during an earthquake. Gabion slopes and cribwalls, which are moored in the substrate, are expected to be less susceptible to landsliding.

Mitigation Measures

Mitigation Measure G-1: Install Sufficient Support and Bracing During Shoring. A shoring system would be designed and installed to specifically control ground movement. This could include the installation of an adequately stiff wall and sufficient bracing. Monitoring of ground movement should also occur throughout the construction period in sensitive areas.

Mitigation Measure G-2: Use a Backhoe to Drive Piles Where Vibration Could Result in Ground Settlement. The vibration intensity caused by pile driving depends on the type of pile driving equipment and the soil conditions on the site. At sites where vibrations may cause ground settlement and in locations where it is feasible, a backhoe or other equipment would be used to drive sheet piles instead of a vibratory pile driver.

Mitigation Measure G-3: Limit Unsupported Slopes to 2:1 and Anchor Gabions/ Cribwalls Unless Determined Otherwise in a Geotechnical Report. Gabion/cribwall linings have been designed for the project to control erosion and ensure slope stability. Gabions/cribwalls proposed in Reaches 6, 7, 8 and portions of 9 and 10 would be securely moored in the sediment substrate to mitigate the effects of seismically-induced slope instability, unless determined otherwise in a geotechnical report.

During construction, all slopes with saturated sands and silts would be shored to prevent slope failure until gabions or retaining walls can be built. All constructed earthen banks should have a 2:1 grade or should approximate the natural preconstruction grade to prevent oversteepening. Construction and design criteria (such as final bank slopes and placement of gabions) would be supervised by a qualified engineer or certified engineering geologist.

Mitigation Measure G-4: Comply with the Uniform Building Code Seismic Resistance Specifications. To reduce the potential for earthquake damage, structures, including bridges and culverts, would be designed to conform with the requirements of the Uniform Building Code for Seismic Zone 4, the most stringent requirements.

Residual Impacts After Mitigation

With implementation of the mitigation measures outlined above, there would be no significant impacts related to geology, soils and seismicity. A properly designed erosion control program, part of the Storm Water Pollution Prevention Plan discussed in the Water Quality section and proper slope design would reduce these impacts to levels of insignificance. Impacts related to seismic hazards, shoring and pile driving would be reduced to a level of insignificance by adherence to building codes and through implementation of mitigation measures outlined above.

Minimize Vegetation Impacts Alternative

Geologic and soils impacts for the Minimize Vegetation Impacts Alternative would be similar to those for the Preferred Project except that more excavation would be required in Reaches 9 through 12. Implementation of mitigation measures recommended for the Preferred Project would reduce potential geologic and soils impacts to a less-than-significant level.

No Project Alternative

Under the No Project Alternative, flooding would continue to occur in the project area and impacts associated with erosion, sedimentation, and slope instability would remain unchanged. Ongoing maintenance activities, including bank stabilization, would only partially mitigate these impacts. Access to the River for maintenance activities would continue along the channel bottom (since no additional levee bench access roads would be constructed), and could result in soil densification under the No Project Alternative.

4.2 SURFACE AND GROUNDWATER HYDROLOGY

Affected Environment/Setting

Hydrologic characteristics of the Guadalupe River are evaluated in the Guadalupe River Planning Study Engineer's Report, which is available for review at the Santa Clara Valley Water District Office. The headwaters of the Guadalupe River are located in the eastern Santa Cruz Mountains near the summit of Loma Prieta, elevation 3,790 feet (Figure 4.2-1). The Guadalupe River begins at the confluence of Alamitos Creek and Guadalupe Creek, where it flows northerly approximately 14 miles through heavily urbanized portions of the City of San Jose, eventually discharging into the San Francisco Bay.

The Guadalupe River has a total drainage area of about 170 square miles south of Highway 237. North of this point, the river enters the baylands area near the community of Alviso and is then subject to tidal influence.

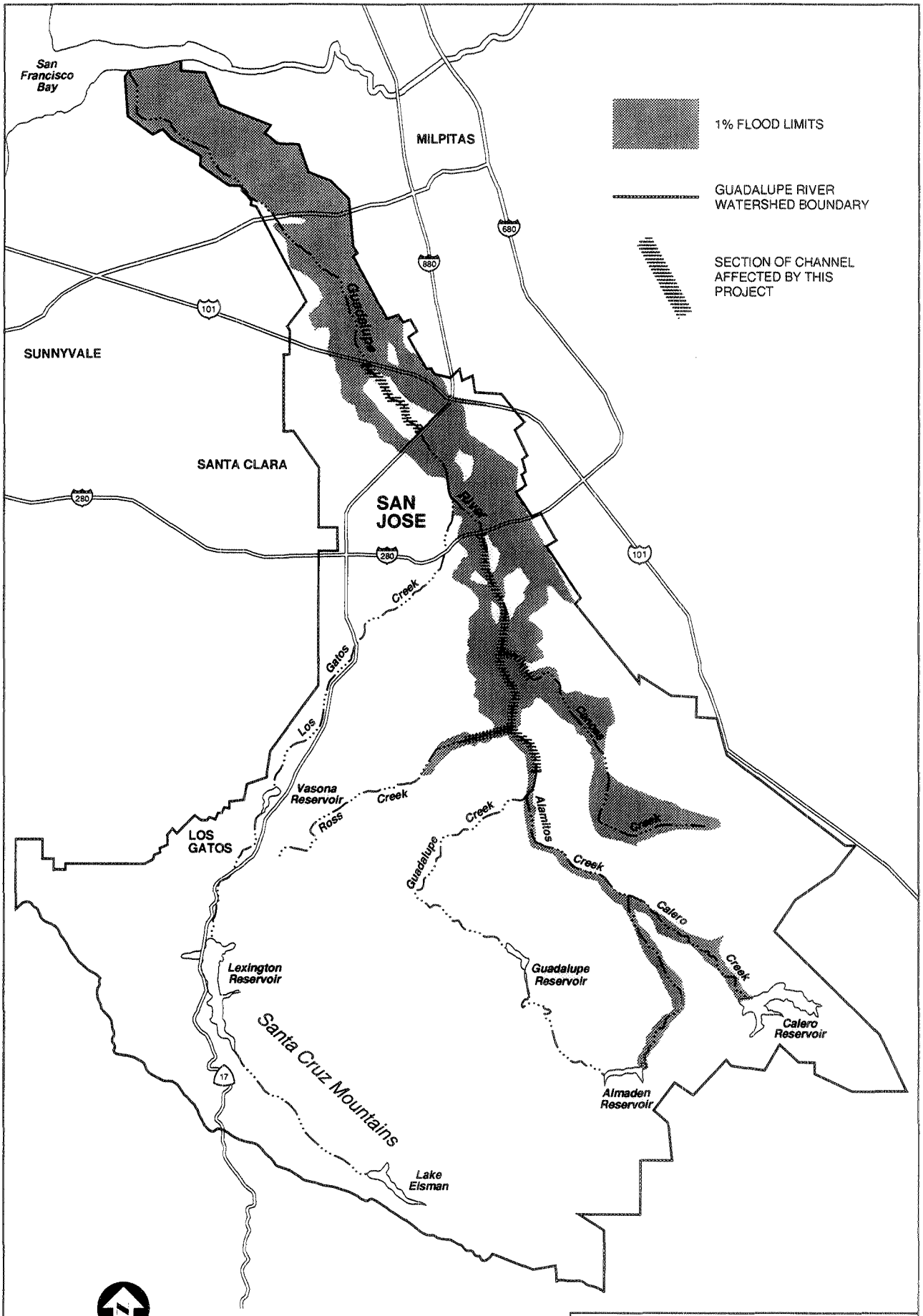
The six largest reservoirs located on upstream tributaries to the Guadalupe River are listed in Table 4.2-1 and shown in Figure 4.2-1. All of these reservoirs were designed and constructed for water conservation and storage purposes, but can provide flood control benefits depending on the size of the upstream drainage areas and the available water storage capacities.

TABLE 4.2-1

GUADALUPE RIVER TRIBUTARY STORAGE RESERVOIR DATA

Storage Reservoir (Creek)	Drainage Area (sq. mi.)	Reservoir Capacity (acre ft.)
Calero (Calero Creek)	7	10,050
Guadalupe (Guadalupe Creek)	6	3,720
Almaden (Alamitos Creek)	12	1,780
Lexington (Los Gatos Creek)	37.5	19,830
Vasona (Los Gatos Creek)	44	400
Lake Elsman (Los Gatos Creek)	9.9	6,280

FIGURE 4.2-1



GUADALUPE RIVER WATERSHED AND 1% FLOOD LIMITS

GUADALUPE FLOOD CONTROL SAN JOSE, CALIFORNIA

REV. 3 C337-99.DWG 09/25/96

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Three tributary creeks join the Guadalupe River as it flows north toward the San Francisco Bay: Ross, Canoas and Los Gatos creeks. Ross Creek drains an area of about 10 square miles before it joins the Guadalupe River just downstream of Branham Lane. Canoas Creek drains an area of about 19 square miles before joining the Guadalupe River just upstream of Curtner Avenue. Los Gatos Creek, with a drainage area of about 55 square miles, joins the Guadalupe River in downtown San Jose; Lexington Reservoir is located on Los Gatos Creek about 11 miles upstream of its confluence with the Guadalupe River (Figure 4.2-1).

Historic Stream Channel

The Guadalupe River played an important role in the settlement of San Jose and, as a result, it has been subject to considerable modification. The first major modification of the stream channel occurred around 1866 when a canal was dug to alleviate flooding and improve conditions for rapidly expanding orchards. This canal was known as the Lewis Canal, and forms the present stream channel from Willow Glen Way to Willow Street; this section is noticeably straighter than both the upstream and downstream channels.

More recently, in the early 1960s, Canoas Creek and Ross Creek were realigned to flow into the Guadalupe River. The Canoas Creek outfall was moved from downstream of Auzerias Avenue to about 1,500 feet upstream of Curtner Avenue, and the Ross Creek outfall was moved from near Koch Lane to 1,000 feet downstream of Branham Lane.

As part of the 1975 Almaden Expressway construction project, about 3,000 feet of the Guadalupe channel, beginning at Almaden Road, was widened and moved eastward. The stream channel was filled to allow the construction of the northbound Expressway. In addition, the stream channel between Branham Lane and Blossom Hill Road was enlarged to a trapezoidal section with a 120-foot bottom width in the early 1970s as part of the Piazza Gravel Quarry operation.

Historic Flooding

The written history of flooding in the Santa Clara Valley begins with the founding of the Mission Santa Clara and Pueblo San Jose de Guadalupe in 1777. Floods during the first few years forced both to move to higher ground. Historic accounts of flooding were recorded in 1779, 1862, 1867, 1869 and 1911.

The storm of December 1955 (the "Christmas Storm") caused widespread flooding throughout the County. The Guadalupe River inundated 200 acres from Hillside Avenue to Branham Lane, and 5,000 acres from the Bay to Brokaw Road. Although extensive flooding occurred as a result of this storm, the flooding would have been much more severe if the upstream storage reservoirs had not been nearly empty prior to the storm event. It was estimated that had these reservoirs been full, the peak flow rate would have been about 17,000 cubic feet per second (cfs) rather than the 5,740 cfs recorded.

Major flooding occurred on the Guadalupe River on April 2, 1958. Floodwaters overbanked in downtown San Jose, covering a two block area to depths of up to 4 feet. Waters also spilled downstream, flooding about 2,700 acres of agricultural land, and inundating the town

of Alviso for 17 days. This discharge was nearly twice the discharge recorded for the December 1955 storm, even though the 1955 precipitation was much greater. This was because the upstream storage reservoirs were full when the 1958 storm occurred.

Recent Flooding

The Guadalupe River recently flooded San Jose communities during the winters of 1980, 1982, 1983, and 1995. Recent and historic peak flow rates are summarized in Table 4.2-2.

TABLE 4.2-2

GUADALUPE RIVER HISTORY

Date	Discharge (cfs) USGS Gage[a]	Recurrence Interval (years)[c]	Discharge (cfs) District Gage[b]
February 27, 1940	8,680	12	—
February 2, 1945	6,600	5	—
January 12, 1952	8,000	10	—
February 13, 1953	8,680	12	—
December 1955	5,740	—	—
April 2, 1958	9,150	15	6,220
February 19, 1980	7,910	7	2,970
March 31, 1982	7,340	6	3,790
January 24, 1983	7,130	6	4,930
February 18, 1986	9,143	12	4,310
January 10, 1995	9,000	14	8,950
March 10, 1995	10,500	6	5,590

a Located downstream of the confluence with Los Gatos Creek.
b Located near Almaden Expressway.
c Magnitudes in years are based on November 1978 District hydrology.

The most recent severe flooding occurred on January 9th and 10th and March 9th to 11th, 1995. On January 9th, flood waters spilled over the banks of the Guadalupe River in Central San Jose along River Street; at Virginia Street, where water flowed onto Highway 87; and near Alma Avenue. Highway 87 was inundated by 10 feet of water from the northbound connector with Interstate 280 to south of the Virginia Street overpass, closing the highway and disrupting travel for thousands of commuters. Water overtopped the riverbanks, seeped through the embankments and cascaded onto Highway 87. The light rail tracks were also submerged in the median of the highway. Overbanking also occurred on Ross Creek at

Cherry Avenue, along Montmorency Drive, and at Jarvis Avenue. Canoas Creek flows overtopped the banks at Redbird Drive, Kingfisher Drive, Calero Avenue, and Blossom Avenue. The mayor of San Jose declared a state of emergency and the President of the United States declared Santa Clara County a federal disaster area. Damage on the Guadalupe River was estimated to be $1,500,000. An estimated $150,000 worth of damage occurred on Canoas Creek.

On March 10, 1995, Guadalupe River carried more water through downtown San Jose than any previous flood of record. The river overbanked the easterly levee between Alma Street and the Union Pacific Railroad bridge in San Jose, flooding the Elk's Lodge property and Alma Street. Floodwaters followed the existing topography downstream flooding Willow Street and properties on McLellan Avenue and Harliss Avenue. Properties on Belmont Way were also flooded. Guadalupe River overtopped its banks upstream of Virginia Street and upstream of Jerome Street flooding Highway 87. Homes along Virginia Street and St. John Street were evacuated due to flooding. Homes and businesses along River Street were flooded for the second time since January. Hotels and new offices needed sandbags to prevent floodwaters from entering the buildings. Downtown museums, the county government building, and the courts all closed to evacuate workers when the surrounding streets flooded. Water continued up San Pedro Street to Hedding Street threatening many older homes and depositing mud and silt. The water flowed east to Sixth Street, entering many buildings in the commercial area, and disrupting traffic and businesses. First Street was deep in water from south of Taylor Street to Hedding Street.

One Percent Flood Description

The following discussion of the one percent flood and the factors affecting flooding in the Guadalupe River watershed were developed by the District (Saah 1989).

The one percent flood is that flow of water from a drainage area that, on the average and over a long period of time, has a one percent chance (probability of 0.01) of being equalled or exceeded in any given year. It is sometimes referred to as the 100-year flood, but it should not be thought of as an event that occurs regularly every 100th year. Instead, it is the flood flow that would be equalled or exceeded perhaps about 100 times in 10,000 years. It is also possible that two repetitions of this flood flow could occur in a single year, or that a single event may not occur even once in 200 years.

The One Percent Flood and the One Percent Storm. The One Percent Flood is related to, but not the same as, the One Percent Storm. Storm magnitude relates to flood magnitude through a complex set of parameters including antecedent rainfall conditions, drainage basin shape, slope length, slope gradient, orientation, and other factors. Therefore, a one percent storm will not necessarily produce a one percent flood. The one percent flood should not be confused with nor should it be referred to as the "one percent storm" or the "one percent storm flood."

Cumulative Risk. The one percent flood has small risk of occurrence in a given year, but the risk is cumulative. When compared with the 30-year life of the average home loan, for example, the chance that such a flood will occur is quite large. During the 30-year loan period, the chance that a one percent flood will occur, or will be exceeded, approaches 30 percent.

The "One Percent Flood" and the "Design Flood." Another relationship that requires explanation is that which exists between the "one percent flood" and a "design flood." A design flood is any particular flood magnitude chosen for designing a flood control project. A design flood could be the one percent flood or it could also be a flood of another probability of occurrence. The one percent design flood (used by the District as its design standard) represents the expected future flow of water from a watershed without constriction, undue storage or delay. The one percent flood under existing watershed conditions (the existing one percent flood) is the flood developed from a watershed with existing limited capacity channels. Such a flood is used by the Federal Emergency Management Agency as a standard for its flood insurance program. The limits of the One Percent Flood are shown in Figure 4.2-1.

One Percent Peak Flows and One Percent Volumes. In general, floods are identified in terms of their peak flows and volumes. In practice, the one percent flood refers to the **one percent peak flow rate** when designing flood control channels and similar water structures. The one percent flood also refers to the **one percent volume** of water when defining overbank storage or when designing flood retention and detention facilities.

The District's Hydrology and the One Percent Flood. The magnitude of the one percent flood is calculated using statistical hydrologic methods. The District uses a uniform method of determining the one percent flood; one that is regional in scope and based on the best available historic rainfall and runoff event data for areas within and adjacent to the County. The regional process used by the District was developed after considerable effort and has been reviewed and approved by the academic and professional communities.

Factors Affecting Floods

The major causes of floods are the preceding storms and their intensity distributions. Other factors that would affect the peaks and/or volumes of floods relate to the physical characteristics of watersheds, either rural or urban.

For rural watersheds these factors are: slope, groundcover, basin shape, and soil type. For urban watersheds, natural conditions are modified by increasing the impervious areas and making the flow paths more efficient. Roof tops, pavement rain gutters, downspouts, curbs, storm drains, levees and culverts can increase the volumes and peaks of flood flows, especially in hilly terrain with steep slopes.

In flat land, the limited capacity of the storm drainage system and the conditions of the levees along the adjacent channels may reduce the peaks of larger urban floods and thereby retain the water in the urban watershed for a longer time. This condition may serve to increase local flooding of urban areas and cause no increase in the flow within the main channel.

Therefore, depending on the local conditions, urbanization could have the effect of increasing or decreasing the flow in the main channels.

Research on the statistical measurement of flood flows and frequencies has shown that larger magnitude floods that occur at relatively infrequent intervals are products of extremely heavy rainfalls, either of exceptionally high intensity or of long duration. With exceptionally high intensity rainfall, so much rain falls in a short period of time that regardless of the ground cover (e.g., soil, pavement, grass, trees or structures), the rainfall cannot be stored or percolated, and consequently runs off in a flood. With long duration rainfall, large quantities of rain falls over a long period of time. Bare soil, grassland, forests, landscaping, rooftops and pavement become fully saturated, and flooding occurs when no more water can be absorbed, stored or evaporated.

One additional factor is relevant to the discussion of flood flows and urbanization: overbank storage in floodplain areas. Where urbanization occurs in the floodplain and the stream is channelized, the storage of overbank floodwater is reduced, resulting in greater downstream flood flows. This increase in flood flows occurs for any magnitude of frequency of flooding that would have resulted in channel overflow and storage of water in the floodplain.

Design Criteria

The size of the one percent flood has been calculated based on statistical hydrologic methods, taking into consideration potential rainfall intensity and duration, historic stream flow records, and drainage basin characteristics. Table 4.2-3 presents the design flow rates for the one percent flood at selected locations along the Guadalupe River. These values are based on Corps of Engineers hydrology studies.

TABLE 4.2-3

GUADALUPE RIVER DESIGN FLOW RATES FOR ONE PERCENT FLOOD (cfs)

Location	Flow
Upstream of Ross Creek	11,400
Downstream of Ross Creek	12,400
Upstream of Canoas Creek	12,400
Downstream of Canoas Creek	14,600
Downstream of Los Gatos Creek	17,000

An important design consideration for the Guadalupe River is its influence on two of its tributary creeks: Ross and Canoas. The existing water surface in the Guadalupe River causes a backwater on both tributaries. The banks of Ross Creek and Canoas Creek are low compared to the Guadalupe River and, therefore, backwater effect from the Guadalupe River results in flooding on Ross Creek during the one percent flood. The design flow rates for Ross and Canoas creeks for the one percent flood are presented in Table 4.2-4.

TABLE 4.2-4

ROSS CREEK AND CANOAS CREEK DESIGN FLOW RATES FOR ONE PERCENT FLOOD
(cfs)

Location	Flow
Ross Creek at Meridian	2,100
Ross Creek upstream Guadalupe River	2,200
Canoas Creek at Capitol Expressway	2,000
Canoas Creek upstream Guadalupe River	2,400

Groundwater

The Santa Clara Valley groundwater basin is the largest and most developed of the groundwater basins within the San Francisco Bay Area. The basin is commonly divided into two areas: the forebay where groundwater occurs in a single, unconfined aquifer and the confined area which consists of two aquifer zones (upper and lower) separated by a regional aquitard. The forebay is located adjacent to the hills that form the perimeter of the basin on the west, south, and east. The forebay is considered the primary recharge area for the groundwater basin. The confined area, as defined by the presence of the regional aquitard, makes up the largest portion of the groundwater basin, occupying the central and northern portion of the basin.

The project area covers portions of both the confined area and the forebay. The upper reaches of the project, from about Reach 8 upstream to Reach 13, are within the forebay area. Portions of the project downstream from Reach 8, including Reach A, are within the confined area of the Santa Clara groundwater basin. The confined area consists of three hydrostratigraphic zones: the upper aquifer zone, the regional aquitard, and the lower aquifer zone.

The upper aquifer zone is composed of Holocene aged alluvial deposits including the young bay muds, older bay muds, and Quaternary alluvial sediments less than 50 feet thick. This zone is characterized by irregular bedding and interfingering fine and coarse materials.

Hydraulic conductivity in the upper aquifer is highly variable, vertical as well as horizontal gradients exist, and aquifers can be locally unconfined (free water table) or semi-confined creating complicated flow patterns. Recharge to the upper aquifer in the project area occurs mainly by infiltration from streams and other surface water sources. The groundwater gradient is generally from the forebay area toward San Francisco Bay.

The regional aquitard zone is generally between 50 feet and 150 feet below ground surface. Sediments within this zone are predominantly fine-grained with overall very low hydraulic conductivity thus preventing natural connection between groundwaters in the upper aquifer zone above and the lower aquifer zone below.

The lower aquifer zone is generally deeper than 150 feet. It is composed predominantly of materials that have low hydraulic conductivities, but contains numerous individual confined aquifers that conduct water under pressure. This zone is fully saturated and is the major source of groundwater extracted from agricultural, industrial, and domestic water-supply wells.

Because the valley floor is relatively flat, hydraulic gradients are gentle. Depths to regional groundwater in the project area range from approximately 60 feet below the ground surface in inland areas to approximately 20 feet below the ground surface near the San Francisco Bay. Locally, perched water could occur at shallower depths. The principal influences on groundwater flow patterns are complexity of the hydrogeologic units, groundwater pumping, land subsidence, artificial recharge and irrigation, tides, and recharge from streams.

The forebay is composed of Quaternary alluvium deposited as a series of coalescing alluvial fans that formed at the base of the hills surrounding the valley. The forebay is the primary groundwater recharge area within the Santa Clara groundwater basin. The alluvium is considered the most important water bearing unit of the Santa Clara Valley groundwater basin (DWR 1975). The forebay exists as a single, unconfined aquifer and is the principal area of recharge for the Santa Clara Valley groundwater basin. Recharge to the forebay is by deep percolation from surface sources that include: streams, rainfall, flooded areas, irrigation water applied in excess of evapotranspiration, and percolation ponds (DWR 1975, Iwamura 1980). Regional groundwater flow is from the elevated margins of the forebay to the center of the confined area where most of the groundwater extraction occurs (Iwamura 1980).

The District has augmented the natural recharge along the Guadalupe River and its tributaries through an artificial recharge program. An additional input to the River is provided by treated water discharge from industrial sites where groundwater cleanup is occurring, which totaled approximately 500 gallons per minute (gpm) in mid-1992, but is decreasing (Iwamura 1992). The groundwater mound beneath the Guadalupe River channel acts as a hydraulic barrier that inhibits the flow of shallow groundwater across the mound, controlling the localized gradient. Regional flow is towards the north-northwest. Groundwater contamination in the project area is discussed in the Water Quality and Hazardous Materials sections of this chapter.

Groundwater Recharge Program

As a wholesaler and manager of water resources in Santa Clara County, the District conserves, imports, treats, distributes, reclaims, and is responsible for the quality and quantity of water supply available in the county. To meet its water supply objectives, the District constructed and now operates and maintains a countywide conservation and distribution system to convey water for recharge and treatment. An important component of the water supply system is the District's artificial groundwater recharge program.

The District owns and operates over 30 recharge facilities in six major recharge systems. These recharge facilities percolate local and imported water into the groundwater basin. The Los Gatos and Guadalupe recharge systems are within the Guadalupe River watershed. In-stream recharge is enhanced by the construction and operation of temporary dams. Off-stream recharge occurs at percolation ponds that are fed by water diverted from tributary creeks or by imported water pipelines. Some of these facilities are located within the project site, in Reaches 11 and 12 and on Ross Creek. Historically, the District has operated recharge facilities only upstream of Capitol Expressway (northern end of Reach 11). The District is currently considering the possibility of expanding the recharge program downstream to Curtner Avenue (northern end of Reach 10).

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

According to the CEQA Guidelines, a project would have a significant effect in the environment if it resulted in substantial depletion of groundwater resources, substantially interfered with groundwater recharge, or caused substantial flooding, erosion, or siltation. This project would not have significant effects on the quality of groundwater. Groundwater quality issues are addressed in Section 4, Hazardous Materials. Potentially significant hydrologic impacts discussed in this section relate primarily to flooding.

Preferred Project

Beneficial Impacts

The project would allow the conveyance of flows up to the one percent flood with adequate freeboard to prevent flood-related damage. The project, together with other planned and/or approved flood control projects, would allow the one percent flood in the Guadalupe River and Ross Creek to be contained in the channel throughout San Jose.

Less-Than-Significant-Impacts

Major flood control projects, such as proposed by this project, substantially alter the hydrologic regime of the river system in which modifications are made. Changes in flow volumes, velocities, and durations can affect flooding and erosion upstream and downstream of the proposed modifications. The Santa Clara Valley Water District (SCVWD) has developed the Preferred Project through a detailed hydraulic analysis that is presented in the

Guadalupe River Planning Study Engineer's Report. This project and other flood control projects along the Guadalupe River are designed to alleviate flooding and minimize stream bank erosion. Potential impacts of the project, such as downstream flooding, have been mitigated by the incorporation of design features and special facilities.

The project would not result in flooding downstream of proposed channel modification because other flood control projects have provided one percent flood capacity in the downtown area downstream of Reach 6 and downstream of Highway 101. Flooding would not be a concern upstream of Reach 12 because none of the proposed alternatives affects the area upstream of Reach 12.

The Preferred Project would be constructed generally beginning in the downstream reaches, so that added flow capacity upstream would not exacerbate downstream flooding. The District would apply for a revised Flood Insurance Rate Map (FIRM) upon project completion.

Several elements of the proposed project could result in reduced groundwater recharge opportunities. The installation of gabion sideslopes would reduce recharge along the sideslopes of the river. Proposed installation of articulated concrete mats or armorflex lining along the side slopes of Ross Creek (the District is currently recharging the groundwater at Ross Creek to the confluence with the Guadalupe River) would reduce the amount of recharge in this area. Disruption of channel bottom and side slopes throughout the river channel could affect the rate of natural recharge within the project site. Temporary dewatering that may be required during project construction could also cause temporary adverse impacts to the rate of groundwater recharge.

It is estimated that 1.3 acres of recharge area would be created in Reach 11A as a result of channel widening. About 0.3 acres of recharge area would be created in Reaches 11B and 11C as a result of channel widening (Santa Clara Valley Water District, 1997). Modifications in Reach 12 on the west bank to create a revegetation bench would result in the loss of about 3.0 acres of in-stream percolation. Construction of a riparian mitigation pond in Reach 12 would provide an additional 4.7 acres of recharge area. The total increase in recharge area along the Guadalupe River as a result of this project is about 3.1 acres. On Ross Creek, channel treatments upstream of Cherry Avenue would result in the loss of 0.1 acres of recharge area that would be offset by the creation of 0.1 acres of recharge area in the channel bottom.

Residual Impacts After Mitigation

The proposed project would not completely eliminate the threat of flooding within the project area; it would, however, greatly reduce the threat of flooding from all but the most extreme events by allowing the conveyance of the one percent flood. Flooding could still potentially occur from more intense storm events (for example, from the 0.5 percent flood or 200 year flood).

Minimize Vegetation Impacts Alternative

From a hydrologic standpoint, the impacts of the Minimize Vegetation Impacts Alternative would be similar to those of the Preferred Project. Construction of a bypass channel in Reaches 9-12 would avoid modifications that could affect in-stream groundwater recharge. However, the discontinued use of the Branham and Blossom Hill seasonal dams would result in the loss of 14 acres of in-stream percolation in Reach 12. If this alternative were implemented, the District should evaluate the water supply need for groundwater recharge and consider compensating for this loss of recharge area by creating additional off-stream or goundwater injection recharge capability. The Minimize Vegetation Impacts Alternative would convey the one percent flood flow within the project area. Therefore, no mitigation measures would be necessary.

No Project Alternative

Impact

This alternative assumes that no flood control project would be implemented. Thus, the existing potential for serious flood damage would continue unchanged, and flooding would be expected to continue on the average of about once every four years.

In the event of the one percent flood occurring with no flood control project implemented, approximately 2,200 acres of land would be inundated, at an estimated cost of over $280 million (Table 4.2-5). Within this area, an estimated 7,200 homes, 230 businesses, and 11 public buildings would be damaged; sediment deposition on roadways would also result in additional cleanup expenses. The following schools would be subject to inundation during the one percent flood: River Glen Elementary, Canoas Elementary, Lincoln Glen Elementary, Washington, Valley View Elementary, and Schallenberger.

Mitigation Measure

Both the Preferred Project and the Minimize Vegetation Impacts Alternative would provide adequate mitigation of the existing flood risk. Because the No Project Alternative would not reduce the existing threat of flooding, implementation of this alternative is not considered practicable because the only possible mitigation would be the removal or flood-proofing of structures within the floodplain.

Residual Impacts After Mitigation

No hydrologic impacts would remain after implementaiton of the recommended mitigation measures for the Preferred Project or the Minimize Vegetation Impacts Alternative.

TABLE 4.2-5

GUADALUPE RIVER
ONE PERCENT DAMAGE ESTIMATE SUMMARY

Damage Item	Area Flooded (Acres)	Number of Buildings
Single Family Residences	1,500	6,710
Apartment Residences		52
Mobile Home	50	450
Commercial	119	158
Industrial	224	74
Schools, Public	25	11
Open Improved	83	0
Agriculture	114	0
Vacant Land	54	0
Automobiles	—	—
Sediment	—	—
TOTALS	**2,176**	**7,455**

4.3 WATER QUALITY

Affected Environment/Setting

Water quality data for the Guadalupe River at San Jose are collected by the U.S. Geological Survey. The closest sampling location to the project site is on the Guadalupe River outside the project area between Reaches A and 6, approximately 100 feet downstream of the confluence with Los Gatos Creek. A broad range of parameters is sampled, including conventional parameters such as dissolved oxygen (DO), turbidity, and pH, as well as concentrations of trace inorganics such as metals (Table 4.3-1).

Data show some evidence of metals and other trace pollutants. Mercury, lead, copper, and zinc are known to be present in the water and sediment in the River. The solubility and transport of these constituents vary with River flow and seasonal conditions. River water is nearly saturated with DO; pH is slightly alkaline; and the water is very hard. Turbidity ranged from a low of 2.3 Nephelometric Turbidity Unit (NTU) during the summer to a high of 17 NTU in November. Active erosion sites are present and erosion occurs throughout the project area, which may be responsible in part for increased turbidity during the winter.

In the early 1980s, IBM and Fairchild began pumping contaminated groundwater, treating it, and discharging to Canoas Creek, a tributary of the Guadalupe River. Some of the groundwater pumped contained contaminants below regulatory limits for discharge and no treatment was necessary; other groundwater was treated with air stripping and/or air towers. The water discharged by IBM and Fairchild provided a steady year-round flow to the Creek in the mid-1980s. Groundwater pumping and related discharge have been declining since 1988 and are currently nearly zero.

The Regional Water Quality Control Board (RWQCB) is the government agency responsible for ensuring that discharges meet state and federal requirements. In partial satisfaction of these requirements, both industrial firms file quarterly self-monitoring reports with the RWQCB. These reports contain water quality data for Canoas Creek, which show that most of the reported contaminants (volatile chlorinated hydrocarbons such as Freon 113 and 1,1,1 trichloroethane) were at concentrations below the detection limits. Freon 113 was detected at 2-3 mg/L on two of the ten testing dates in the first quarter of this year.

Water quality of the River may also be affected by groundwater discharges. Under high groundwater conditions, groundwater flow may be directed towards the River and may transport chemicals from nearby hazardous waste sites, some currently being investigated and/or remediated and others that have not yet been documented. This topic is discussed more fully in the Hazardous Materials section of this EIR/EIS.

TABLE 4.3-1

U.S. GEOLOGICAL SURVEY SELECTED HISTORICAL WATER QUALITY DATA FOR THE GUADALUPE RIVER FOR WATER YEARS 1949, 1968, 1969, 1979 TO 1983, 1987 TO MARCH 1994

	Feb 8 1946	Nov 6 1967	Mar 7 1968	Oct 29 1968	May 20 1969	Aug 1 1979	Feb 19 1980	Sep 10 1980	Mar 27 1981	Sep 1 1981	Jan 5 1982	Sep 8 1982
Streamflow (cfs)	NA	1	14	2	NA	NA	7,900	0.53	3.7	728	943	2.8
Temperature (Celsius)	NA	14	14	15	10	NA	12.5	18	15.5	19.5	11	23
pH	NA	NA	NA	NA	NA	NA	6.8	7.8	8	8	7.9	7.5
Turbidity (NTUs)	NA	NA	NA	NA	NA	NA	800	4	16	2.6	270	1.5
Dissolv. Oxygen (mg/L)	NA	NA	NA	NA	NA	NA	NA	NA	84	9.8	10.5	116
Chemical Oxy. Demand (mg/L COD)	NA	NA	NA	NA	NA	NA	280	39	43	69	47	30
Hardness (mg/L $CaCO_3$)	140	NA	NA	NA	NA	NA	68	350	130	NA	113	200
Total Nitrogen (mg/L N)	NA	NA	NA	NA	NA	2.1	0.93	1.2	0.82	1.4	1.8	0.4
Total Phosphorus (mg/L P)	NA	NA	NA	NA	NA	0.07	2.8	0.22	0.21	0.24	0.25	0.09
Dissolv. Arsenic (mg/L As)	NA	NA	NA	NA	NA	NA	2	4	10	2	2	2
Dissolv. Cadmium (mg/L CD)	NA	<1.4	<1.4	<1.4	<1.4	<1	0	0	1	0	1	<1
Dissolv. Chromium (mg/L Cr)	NA	<1.4	<1.4	<1.4	<1.4	0	0	0	10	0	<10	<10
Dissolv. Copper (mg/L Cu)	NA	<1.4	<1.4	<1.4	<1.4	2	2	2	6	2	2	5
Dissolv. Lead (mg/L Pb)	NA	<1.4	<1.4	<1.4	<1.4	0	0	2	3	5	6	<1
Dissolv. Manganese (mg/L Mn)	NA	171	19	15	20	30	10	0	20	0	20	20
Dissolv. Mercury (mg/L Hg)	NA	NA	NA	NA	NA	0	0	0	0	0.36	<0.1	<0.1
Dissolv. Nickel (mg/L N)	NA	234	9.7	43	37	0	0	0	0	0	<100	<100
Dissolv. Selenium (mg/L Se)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Silver (mg/L Ag)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Zinc (mg/L Zn)	NA	<5.7	<5.7	<5.7	<5.7	6	190	10	20	40	10	30

ND = Not Detectable

NA = Not Available

Source: Water Chemistry of Santa Clara Valley, California 1970; USGS Water Resources Data for California 1979 to 1983, 1985, 1987 to July 1991; and Nonpoint Source Records for Metals Concentration for water years 1991 to 1994.

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994. These data appear in bold/italic typeface.

TABLE 4.3-1 (continued)

	Jan 27 1983	Aug 30 1983	Feb 9 1985	Sep 11 1985	Jan 28 1987	Aug 11 1987	Nov 17 1987	Aug 17 1988	Jul 25 1989	Oct 25 1989	Jan 13 1990	Feb 17 1990
Streamflow (cfs)	1,540	20	116	20	36	16	47	4.3	1	29	608	210
Temperature (Celsius)	NA	NA	10	17.5	13	22	16	21	21	16	NA	10
pH	7.9	8.3	8.2	8.4	8.1	8.4	8.1	8.2	7.8	7.6	7.3	8.1
Turbidity (NTUs)	350	4.5	30	24	17	8	17	5	4.4	44	76	42
Dissolv. Oxygen (mg/L)	10.6	10.6	10.8	9.4	92	10.4	8.6	7.9	8.6	8.1	NA	10.2
Chem. Oxy. Demand (mg/L COD)	46	24	27	10	24	<10	29	47	16	39	110	62
Hardness (mg/L $CaCO_3$)	99	350	220	340	180	340	220	350	380	110	52	120
Total Nitrogen (mg/L N)	0.8	2.9	2.1	3.2	1.7	2.3	2.8	2	1.2	1.2	2.1	2.1
Total Phosphorus (mg/L P)	0.6	0.05	0.1	0.05	0.1	0.09	0.13	0.06	0.07	0.19	0.27	0.25
Dissolv. Arsenic (mg/L As)	1	1	<1	1	2	1	1	1	1	NA	NA	NA
Dissolv. Cadmium (mg/L CD)	<1	<1	<1	1	<1	<1	<1	<1	<1	NA	NA	NA
Dissolv. Chromium (mg/L Cr)	<10	<10	<10	NA	<1	2	2	<1	<1	NA	NA	NA
Dissolv. Copper (mg/L Cu)	2	1	3	<1	2	<1	5	1	<1	NA	NA	NA
Dissolv. Lead (mg/L Pb)	<1	<1	2	1	<5	<5	<5	<5	<1	NA	NA	NA
Dissolv. Manganese (mg/L Mn)	10	12	8	20	10	9	13	12	16	NA	NA	NA
Dissolv. Mercury (mg/L Hg)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	NA	NA	NA
Dissolv. Nickel (mg/L N)	<100	<100	<100	<100	<1	<1	5	3	1	NA	NA	NA
Dissolv. Selenium (mg/L Se)	NA	NA	NA	NA	1	3	1	3	3	NA	NA	NA
Dissolv. Silver (mg/L Ag)	NA	NA	NA	NA	<1	<1	<1	<1	<1	NA	NA	NA
Dissolv. Zinc (mg/L Zn)	70	9	<3	<10	8	<3	12	10	10	NA	NA	NA

ND = Not Detectable

NA = Not Available

Source: Water Chemistry of Santa Clara Valley, California 1970; USGS Water Resources Data for California 1979 to 1983, 1985, 1987 to July 1991; and Nonpoint Source Records for Metals Concentration for water years 1991 to 1994.

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994. These data appear in bold/italic typeface.

TABLE 4.3-1 (continued)

	Aug 27 1990	Mar 24 1991	Feb 11 1992	Dec 5 1992	Jan 5 1992	Feb 7 1993	Feb 17 1993	Mar 23 1993	Dec 14 1993	Jan 23 1994	Feb 7 1994	Mar 25 1994
Streamflow (cfs)	1.8	1,120	897	1.3	6	52	62	158	119	22	300	55
Temperature (Celsius)	20	11.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
pH	7.8	8	NA	NA	NA	7.7	7.7	7.6	NA	NA	NA	NA
Turbidity (NTUs)	1.5	33	NA	260	110	90	250	80	70	27	130	100
Dissolv. Oxygen (mg/L COD)	7.5	10.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chem. Oxy. Demand (mg/L COD)	22	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hardness (mg/L $CaCO_3$)	310	160	NA	120	110	150	130	140	98	240	120	120
Total Nitrogen (mg/L N)	5.8	1.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Phosphorus (mg/L P)	0.11	0.18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dissolv. Arsenic (mg/L As)	NA	NA	***2.5***	***4***	***1.7***	***2.2***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Cadmium (mg/L CD)	NA	NA	***0.7***	***1.3***	***0.3***	***0.2***	***0.4***	***0.8***	***0.2***	***0.6***	***0.4***	***0.5***
Dissolv. Chromium (mg/L Cr)	NA	NA	***40***	***56***	***7.3***	***5.5***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Copper (mg/L Cu)	NA	NA	***33***	***54***	***18***	***7.9***	***20***	***24***	***19***	***15***	***20***	***26***
Dissolv. Lead (mg/L Pb)	NA	NA	***43***	***63***	***21***	***13***	***30***	***34***	***30***	***19***	***32***	***31***
Dissolv. Manganese (mg/L Mn)	NA	NA	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Mercury (mg/L Hg)	NA	NA	***ND***	***0.6***	***ND***	***ND***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Nickel (mg/L N)	NA	NA	***77***	***160***	***9.4***	***19***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Selenium (mg/L Se)	NA	NA	***0.22***	***0.47***	***0.43***	***0.43***	***NA***	***NA***	***NA***	***NA***	***NA***	***NA***
Dissolv. Silver (mg/L Ag)	NA	NA	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***	***ND***
Dissolv. Zinc (mg/L Zn)	NA	NA	***150***	***210***	***70***	***45***	***65***	***120***	***64***	***62***	***88***	***98***

ND = Not Detectable

NA = Not Available

Source: Water Chemistry of Santa Clara Valley, California 1970; USGS Water Resources Data for California 1979 to 1983, 1985, 1987 to July 1991; and Nonpoint Source Records for Metals Concentration for water years 1991 to 1994.

Note: Data for Arsenic, Cadmium, Chromium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, and Zinc are in total values from February 1992 to March 1994. These data appear in bold/italic typeface.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Substantial degradation of water quality or contamination of a public water supply are considered by the CEQA Guidelines to be significant water quality impacts. Degradation of water quality may result from erosion and sedimentation, changes in water temperature, altered water chemistry, or changes in the volume of surface or groundwater.

Preferred Project

Beneficial Impacts

Routine maintenance such as vegetation removal from floodways and channel repairs would decrease in the main channel and new maintenance activities would be required in the bypass channels only. Channel improvements, which include erosion repair and flood flow control facilities, would reduce the incidence of erosion. Right-of-way acquisition would allow greater District access to the project area and facilitate erosion repair of the channel. These activities would improve water quality with regard to turbidity and should, therefore, reduce the movement of sediments containing mercury, copper, lead, and zinc through the River system.

Continued remediation of potentially hazardous materials, including removal and treatment of contaminated soil and groundwater, in the vicinity of the Guadalupe River could contribute to improved surface and groundwater quality. Removal of residential uses adjacent to the River in some areas, under the Preferred Project, would reduce the incidence of unauthorized disposal of refuse and household hazardous wastes in the River and should contribute to improved water quality.

Less-Than-Significant Impacts

Implementation of the Preferred Project would result in a change in the use of herbicides to control vegetation. The construction of access ramps and depressed maintenance roads would result in the increased use of herbicides for pre-emergent vegetation and would transfer the use of herbicides from the top of the bank to depressed roads, closer to the River. The District uses only U.S. EPA-approved herbicides and follows all manufacturers' health and safety guidelines for application, storage, and transportation of these substances. These herbicides are applied by certified personnel. The use of herbicides for maintenance vegetation control under the Preferred Project should not result in significant adverse water quality impacts.

Construction Impacts

Impact WQ-1: Construction-Related Erosion and Sedimentation. The Preferred Project includes construction activities for channel widening, bench and levee construction, repair of erosion sites and the construction of bridges, maintenance roads and bypass channels. These

activities would require excavation and stockpiling of soils which may lead to erosion and/or siltation of the existing channel. Excavated soils could contain hazardous materials which could enter the River if erosion or slope failure were to occur. The potential for encountering hazardous materials is discussed in Section 4.4, Hazardous Materials, of this EIR/EIS.

Mitigation Measures

Mitigation Measure WQ-1: Prepare and Implement a Storm Water Pollution Prevention Plan. Prior to construction activity, a Notice of Intent and annual fee would be submitted to the State Water Resources Control Board for coverage under the NPDES General Construction Activity Storm Water Permit. This permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan, which must contain source reduction, erosion and sediment control measures, and best management practices designed to reduce the amount of pollutants that may be discharged to the environment via storm water. The District would comply with requirements set forth in the General Permit. Full compliance should reduce potential impacts to an insignificant level.

A Storm Water Pollution Prevention Plan should include the following features:

- Conducting as much construction as possible during the dry season (mid-April to mid-October)
- Terracing of disturbed slopes, if necessary, to prevent wash-out during severe storms
- Installation of detention ponds at the bottom of slopes during construction
- Use of sediment catchment barriers, such as straw bales, to control runoff during construction
- Use of timed-release fertilizer in areas where disturbed soil with low fertility may hinder re-establishment of vegetation
- Immediate re-seeding with native species after construction
- Netting or other ground covers to impede soil loss on steep slopes

After construction is complete and winter rains begin, monitoring of erosion control measures would be conducted by the District. Sites that are actively eroding would be subject to progressively increasing remedial action, as described in the District's proposed Maintenance Program (Appendix C). Appendix C also outlines specifications for sediment removal procedures. Refer to the Fisheries portion of the Biotic Resources section of this EIR/EIS for additional measures to maintain quality of bottom habitat.

Residual Impacts After Mitigation

If the mitigation measures described above are implemented, there would be no significant construction-related water quality impacts from construction activities or ongoing operation and maintenance of the project. A properly designed and constructed Storm Water Pollution

Prevention Program would reduce erosion to an insignificant level, and if monitored properly, to near background levels.

Minimize Vegetation Impacts Alternative

In most reaches, the Minimize Vegetation Impacts Alternative is similar to the Preferred Project. Construction of an earth bypass channel in Reaches 9, 10A, 10C, 11A, and 12 rather than a widened channel could reduce construction-related sedimentation in the main channel of the Guadalupe River. However, excavation of the bypass channel would occur further from the River, would involve more developed properties, and could encounter hazardous wastes that could adversely affect surface water quality. These impacts are discussed in the Hazardous Materials Section of this EIR/EIS. Under the Minimize Vegetation Impacts Alternative, the Branham Street and Blossom Hill seasonal dams would reduce turbidity and could result in improved water quality. Mitigation measures recommended for the Preferred Project should be incorporated in the Minimize Vegetation Impacts Alternative and would reduce impacts to a less than significant level.

No Project Alternative

No construction impacts would occur under the No Project Alternative. Routine channel clearing and bank stabilization would continue. However, active erosion throughout the project area would continue in the absence of channel improvements. Access to the river for erosion control efforts would remain limited. Existing seasonal gravel dams in Reach 12 would remain under the No Project Alternative.

Aside from routine maintenance to control erosion and selective vegetation removal that also reduces the threat of bank erosion, no mitigation measures would be undertaken for the No Project Alternative.

4.4 HAZARDOUS MATERIALS

Affected Environment/Setting

The Preferred Project includes right-of-way acquisition and construction activities related to channel modifications along 12 reaches of the Guadalupe River, a total distance of approximately 9 miles. Several investigations have been conducted since 1991 to evaluate the potential for and identify the types, magnitude, and extent of environmental contamination, including:

- 1991 initial review of regulatory agency files to identify reported releases of hazardous materials within an approximately 2,000-foot wide corridor along the Preferred Project area, and a follow-up visual reconnaissance at those identified sites to evaluate visual evidence of contamination or potential impacts due to proposed Project construction activities
- 1992 review of regulatory agency files to identify sites reported as users, generators and releases of hazardous materials within 500 feet of the Project limits (Kleinfelder 1992a), and follow-up Preliminary Site Assessments at some of those identified sites that were considered for acquisition by SCVWD (Kleinfelder 1992b)
- 1994 Level II Hazardous Materials Investigation (soil and/or groundwater sampling and laboratory analysis) at sites with known or suspected contamination within the Project limits (Kleinfelder 1995)
- 1996 updated files review for sites within 500 feet of the Project limits that were identified in the 1991 and 1992 files review as having reported releases of hazardous materials

Users, generators, and reported releases of hazardous materials were identified by researching local, state, and federal regulatory agency files and contaminated site lists. Specific sources of information reviewed are included in Chapter 11 of this EIR/EIS. Appendix HW-1 is a discussion of the regulatory framework dealing with contamination in soil and groundwater.

Table 4.4-1 summarizes sites identified as having a reported release of hazardous materials in the vicinity of the Project limits, and that are recommended for further investigative action by SCVWD as they have the potential to impact Project acquisition and/or construction activities (SCVWD 1995). Figure 4.1 shows the location of these sites. More detailed information on these sites is provided in subsequent paragraphs.

Table 4.4-2 summarizes sites identified as having a reported release of hazardous materials in the vicinity of the Project limits, and that SCVWD has recommended no further investigation or remediation is required as regards impacts to Project acquisition and/or construction activities (SCVWD 1995). Sites reported as having a reported release of hazardous materials that are located downstream of Reach 6 are within the Downtown Reach, which is a separate flood control Project. This area is downgradient of Reach 6 and these sites would not affect this proposed Project and therefore are not listed in this analysis. Other reaches where no

TABLE 4.4-1

REPORTED RELEASES OF HAZARDOUS MATERIALS IN VICINITY OF PROJECT: FURTHER ACTION RECOMMENDED

Site #	Site Name/Address	Potentially Impacted Reach	Source of Contamination	Identified Contaminant(s)	Groundwater Impacted?	Lead Regulatory Agency	Property to be Acquired or Area of Construction?	Date of Most Recent Agency Information Reviewed
1	Bennett's Auto Shop 385 Willow Street	7	unknown	mercury	NA	SCVWD[(b)]	Yes	5/95
2	Santa Clara County APN 434-04-02, adjacent to Willow Street complex	7	pesticide usage	pesticides	NA	SCVWD[(a)]	Yes	5/95
3	Caltrans and Lee's Diesel Service 1125 Lelong Avenue 450 Willow Street. APN 434-04-06	7	LUST	gasoline	Yes	SCVWD[(a)]	Yes	5/95
4	Multiple businesses 1127 Lelong Avenue (APN 434-04-11) 456 Willow Street (APN 434-04-66)	7	LUST; pesticide usage	pesticides, gasoline	Yes	SCVWD[(a)]	Yes	5/95
5	Bruzzone Property Aly's Tree Trimming 1145 Lelong Avenue APN 434-04-13 APN 434-04-14	7	unknown	lead	NA	SCVWD[(a)]	Yes	5/95
6	Elk's Club 444 W. Alma Avenue APN 434-20-23	7	unknown	mercury	NA	SCVWD[(a)]		5/95

TABLE 4.4-1 (continued)

Site #	Site Name/Address	Potentially Impacted Reach	Source of Contamination	Identified Contaminant(s)	Groundwater Impacted?	Lead Regulatory Agency	Property to be Acquired or Area of Construction?	Date of Most Recent Agency Information Reviewed
7	Golden State Builder, Farr Construction 1891 Almaden Road APN 455-21-57 APN 455-21-56	9	unknown potential impacts from aboveground storage tanks. Level II Investigation recommended by SCVWD		NA	SCVWD[(a)]		5/95
C24 [(a)]	Valley View Packing 1095 Hillsdale Avenue APN 455-12-07 APN 455-39-03 APN 455-39-06	10C	LUSTs	gasoline diesel aromatic hydrocarbons	0.2 ppm 0.9 ppm 0.7 ppb	SCVWD	Yes	2/96

Notes:

(a) = Site not listed in SCVWD or RWQCB reported release case files. Further investigation and/or remediation recommended by SCVWD following level I/II Investigation (SCVWD 1995)

(b) = Site closure granted by Fuel Leaks Division of SCVWD. Case is still active as regards mercury contamination in shallow soils

LUST = Leaking Underground Storage Tank

NA = Not Analyzed

ppb = Parts Per Billion (equivalent to µg/L)

ppm = Parts Per Million (equivalent to mg/Kg or mg/L)

RWQCB = California Regional Water Quality Control Board — San Francisco Bay Region

SCVWD = Santa Clara Valley Water District

Sites in **bold** indicate accompanying project summaries in text

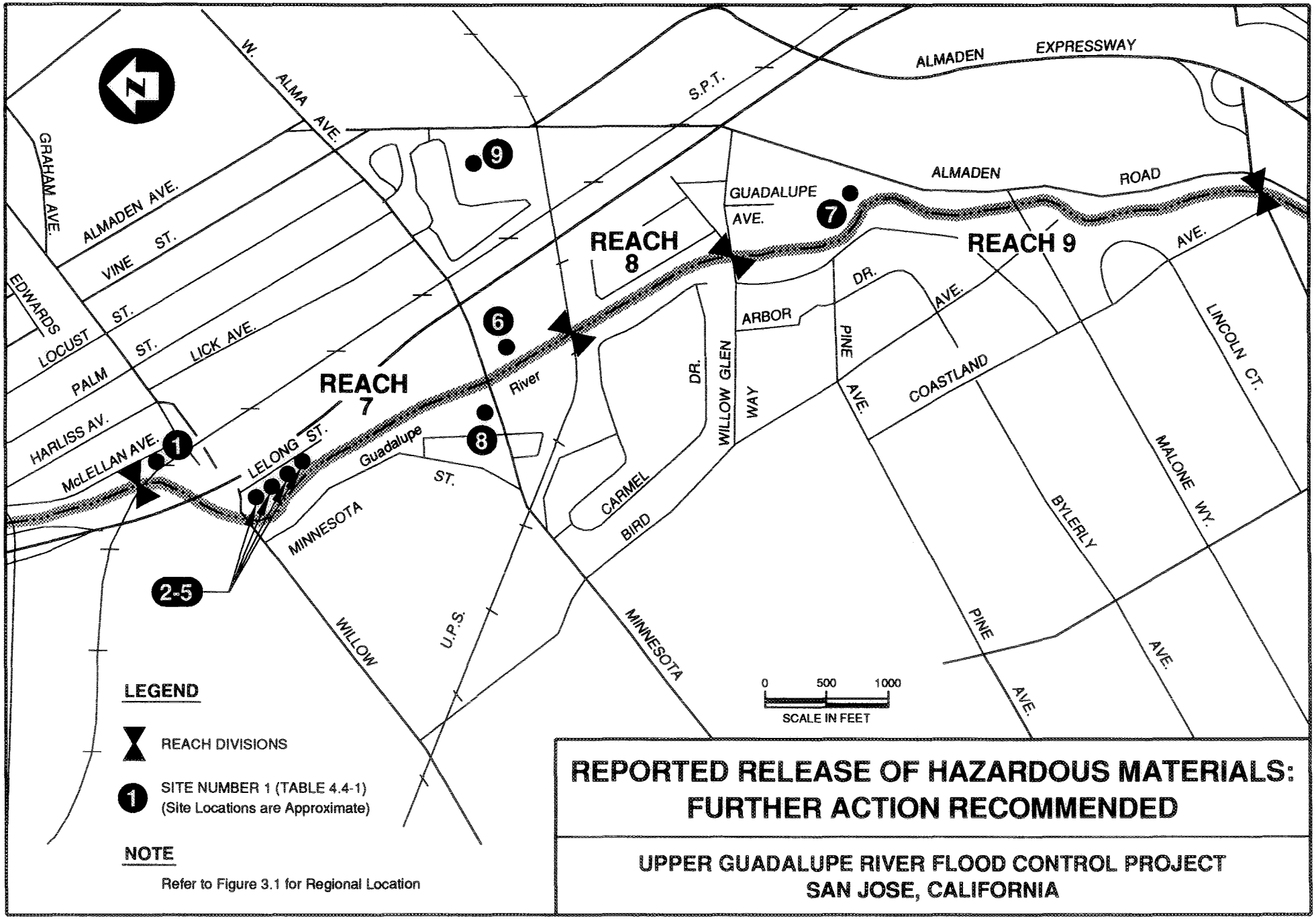

REV.3 GUA12-01.DWG 11/18/96
PARSONS ENGINEERING SCIENCE, INC.
N
W. ALMA AVE.
S.P.T.
ALMADEN EXPRESSWAY
GRAHAM AVE.
ALMADEN AVE.
VINE ST.
EDWARDS
LOCUST ST.
PALM ST.
LICK AVE.
HARLISS AV.
McLELLAN AVE.
LELONG ST.
Guadalupe River
REACH 7
REACH 8
REACH 9
GUADALUPE AVE.
ALMADEN ROAD
ARBOR
DR.
AVE.
PINE
COASTLAND
LINCOLN CT.
WILLOW GLEN WAY
CARMEL
BIRD
MINNESOTA
ST.
BYLERLY
MALONE WY.
WILLOW
U.P.S.
MINNESOTA
PINE AVE.
AVE.
1
2-5
6
7
8
9
0 500 1000
SCALE IN FEET
LEGEND
REACH DIVISIONS
SITE NUMBER 1 (TABLE 4.4-1)
(Site Locations are Approximate)
NOTE
Refer to Figure 3.1 for Regional Location
REPORTED RELEASE OF HAZARDOUS MATERIALS:
FURTHER ACTION RECOMMENDED
UPPER GUADALUPE RIVER FLOOD CONTROL PROJECT
SAN JOSE, CALIFORNIA
FIGURE 4.4-1

TABLE 4.4-2

REPORTED RELEASES OF HAZARDOUS MATERIALS IN VICINITY OF PROJECT: NO FURTHER ACTION RECOMMENDED

Site Name/Address	Date of Case Closure	Lead Regulatory Agency	Property to Be Acquired or Area of Construction?
Shell 225 Airport Parkway Reach A	4/4/96	SCVWD	No
Santa Clara County Office of Education 100 Skyport Drive Reach A	pre-1991	RWQCB	No
Hertz Rent-A-Car 1617 Airport Boulevard Reach A	Active	RWQCB	Yes
Dollar Rent-A-Car 1661 Airport Boulevard Reach A	Active	RWQCB	Yes
National Rent-A-Car 1661 Airport Boulevard Reach A	5/19/93	RWQCB	Yes
Budget Rent-A-Car 1661 Airport Boulevard Reach A	2/24/92	RWQCB	Yes
Avis Rent-A-Car 1445 Airport Boulevard Reach A	Active	RWQCB	Yes
Chevron Marketing Terminal 1401 Airport Boulevard Reach A	Active	RWQCB	Yes
E.A. Mclean & Sons 951 Hamline Street Reach A	12/29/95	SCVWD	No
International Airport Vehicle Maintenance 1395 Airport Boulevard Reach A	Active	RWQCB	Yes

TABLE 4.4-2 (continued)

Site Name/Address	Date of Case Closure	Lead Regulatory Agency	Property to Be Acquired or Area of Construction?
San Jose International Airport 1101 Airport Boulevard Reach A	Active	RWQCB	No
Thrifty #039 (Arco #5384) 545 Alma Avenue Reach 7	Active	SCVWD	Yes
Almaden Property (a.k.a. Louis Smith) 1545 Almaden Road Reach 7	Active	RWQCB	No
Chevron #9688 2302 Almaden Road Reach 9	6/25/91	RWQCB	Yes
Paragon Imports 1095 Foxworthy Avenue Reach 10C	Active	RWQCB	No
Chevron #90481 1190 Hillsdale Avenue Reach 11A	Active	SCVWD	No
Upton 3278 Almaden Expressway Reach 11B	pre-1991	RWQCB	Yes
Pennington Realty 14025 Almaden Expressway Reach 11C	pre-1991	RWQCB	Yes
Arco #2114 4995 Almaden Expressway Reach 12	Active	SCVWD	No
Blossom Hill Goodyear 970 Blossom Hill Road Reach 12	pre-1991	SCVWD	No
Mobil 1099 Blossom Hill Road Reach 12	Active	SCVWD	No

TABLE 4.4-2 (continued)

Site Name/Address	Date of Case Closure	Lead Regulatory Agency	Property to Be Acquired or Area of Construction?
Park Almaden Quarry Coleman Road and Winfield Boulevard Reach 12	pre-1991	RWQCB	No
Taylor Development 999 Blossom Hill Road Reach 12	2/5/92	RWQCB	Yes
Santa Clara Valley Water District Corporation Yard 5750 Almaden Expressway Reach 12	12/20/93	RWQCB	Yes
Kaiser Development Blossom Hill Road Reach 12	pre-1991	RWQCB	Yes
Residence 774 McLellan Avenue APN 264-53-43	(b)	SCVWD	
SCVWD 940 McLellan Avenue APN 264-40-80	(b)	SCVWD	
Guadalupe Expressway at Willow Street APN 264-48-94 APN 264-48-10	(b)	SCVWD	
Bruzzone Property Dependable Autoworks 456 Willow Street APN 434-04-03	(b)	SCVWD	
Bruzzone Property 456 Willow Street APN 434-04-04	(b)	SCVWD	
Bruzzone Property Outboard Inboard Marine 1143 Lelong Avenue and 456 Willow Street APN 434-04-12 Reach 7	(b)	SCVWD	

TABLE 4.4-2 (continued)

Site Name/Address	Date of Case Closure	Lead Regulatory Agency	Property to Be Acquired or Area of Construction?
County Transportation Agency Vacant Lot E. Alma Street at Lelong Avenue APN 434-13-23 Reach 7	(b)	SCVWD	
SCVWD 525 W. Alma Street APN 434-14-66 Reach 7	(b)	SCVWD	
Creekside Inn Property 520 Alma Street APN 434-19-27 Reach 7	(b)	SCVWD	
Residence 1555 MacKey Road APN 434-27-33 Reach 8	(b)	SCVWD	
Desmond Johnson Property APN 455-27-09 Reach 9	(b)	SCVWD	
7-Eleven and Mignosas Wine and Flowers 940 Ironwood Drive APN 455-17-87 Reach 10	(b)	SCVWD	
Auto Parts Volvo and Dodge Country 1120 and 1020 W. Capital Expressway APN 459-06-39 and APN 459-03-08 Reach 11	(b)	SCVWD	
Residence 13394 Steval Place APN 459-06-036 Reach 11	(b)	SCVWD	

TABLE 4.4-2 (continued)

Site Name/Address	Date of Case Closure	Lead Regulatory Agency	Property to Be Acquired or Area of Construction?
Residence 3969 Wellington Sq. APN 459-02-13 Reach 11	(b)	SCVWD	
Agricultural Land East side of Almaden Road, north and south of Chynoweth Avenue APN 459-17-06, APN 459-17-17, APN 459-17-01 Reach 12	(b)	SCVWD	
County Traffic Highway 85 at Sanchez Drive APN 459-16-27 Reach 12	(b)	SCVWD	

Notes:

(a) = Site designation per Kleinfelder 1992a

(b) = Site not found in RWQCB or SCVWD reported release case files. No-further-action status recommended by SCVWD following a Level I/II Investigation (SCVWD 1995)

RWQCB = California Regional Water Quality Control Board — San Francisco Bay Region

SCVWD = Santa Clara Valley Water District

reported releases of hazardous materials were identified with the potential to impact the Project include Reaches A, 8, 10A, 10B, 11A, 11B, and 12.

In addition to the sites listed in Tables 4.4-1 and 4.4-2, Level II sampling and analysis of river sediment and embankment soil was conducted at random locations within areas of Project construction, including channel widening, bypass channels, island banks and river benches. The objective of the sampling and analysis was to determine the potential for contamination in soils and sediments to be excavated that would require special handling and disposal (SCVWD 1995). A total of 24 soil borings were advanced and sampled between August and October 1994. Sample depths ranged from 1 to 21 feet below ground surface. Laboratory analyses were conducted for petroleum hydrocarbons and metals. A total of 10 river shallow sediments were collected in July 1994 for laboratory analysis for petroleum hydrocarbons. Based on the results of the Level II sampling and analysis, the SCVWD has recommended that no further investigation is necessary as regards river sediment and embankment soil.

Hydrogeologic conditions in the vicinity of the Project limits are discussed in Section 4.2 of this EIR/EIS. Briefly, significant fluctuations occur in local groundwater flow direction and depth to first occurrence of groundwater, based on local hydrogeologic conditions and precipitation. In addition, groundwater pumping at contamination remediation sites in the Project vicinity may affect local groundwater flow direction. In areas where groundwater elevation is above the base of the River (such as local swampy areas or during times of heavy precipitation), groundwater may discharge into the River. In that case, groundwater contamination from nearby hazardous materials release sites may enter the River. Conversely, where groundwater elevation is below the base of the River, discharge from the stream to groundwater would occur. In either case, construction activities conducted at depths below the local water table has the potential to encounter contaminated groundwater resulting from nearby hazardous materials release sites.

Reach 7

Six reported releases of hazardous materials were identified in the vicinity of the Project limits within Reach 7. These releases are located at properties to be acquired for the Project or within the area of Project construction activities.

Site 1: Bennett's Automotive, 385 Willow Street. A site reconnaissance and Level II soil sampling and analysis was conducted in the portion of this property to be acquired. Shallow soils (0.5 to 2.0 feet below grade) were found to contain hazardous concentrations of mercury. Investigations did not suggest evidence of groundwater contamination; therefore, groundwater was not sampled or analyzed. The SCVWD has recommended that the property owner remediate and document to SCVWD the soil contamination prior to acquisition (SCVWD 1995).

Site 2: Santa Clara County, Willow Street and Lelong Avenue. Hazardous levels of pesticides were documented in shallow soils at this vacant property during Level II sampling and analysis activities in 1994. Investigations did not suggest evidence of groundwater

contamination; therefore, groundwater was not sampled or analyzed. The SCVWD has recommended that the property owner remediate and document to SCVWD the soil contamination prior to acquisition (SCVWD 1995).

Site 3: Caltrans and Lee's Diesel Service, 1125 Lelong Avenue and 450 Willow Street. Soil and groundwater contaminated with gasoline were documented in 1994 at this parcel during Level II soil and groundwater sampling activities. The source of the contamination is inferred to have existed between this parcel and adjacent parcel APN 434-04-66. The impacted area is estimated to be 30-feet wide, 80-feet long, and at a depth between 10 to 45 feet, corresponding to approximately 4,050 cubic yards of soil. Impacts from an existing underground storage tank (UST) were not confirmed during the investigation. The SCVWD has recommended that the property owner remediate the soil and groundwater contamination, and remove and obtain closure for the existing UST, prior to property acquisition (SCVWD 1995).

Site 4: Bruzzone Property, Paramount Roofing and Multiple Businesses, 1127 Lelong Avenue and 456 Willow Street. Soil and groundwater contaminated with gasoline were documented in 1994 at this parcel during Level II soil and groundwater sampling activities, and is inferred to be related to the contamination at the adjacent Caltrans and Lee's Diesel Service parcel (Site 3). Approximately 8,600 cubic yards of soil is estimated to be contaminated with gasoline. The SCVWD has recommended that the property owner remediate and document to SCVWD the soil and groundwater contamination prior to property acquisition (SCVWD 1995).

Site 5: Bruzzone Property and Aly's Tree Trimming, 1145 Lelong Avenue. Hazardous concentrations of lead in shallow soil were documented in 1994 at this parcel during Level II soil sampling and analysis activities. Investigations did not suggest evidence of groundwater contamination; therefore, groundwater was not sampled or analyzed. The SCVWD has recommended that the property owner remediate and document to SCVWD the approximately 20 cubic yards of soil contamination prior to property acquisition (SCVWD 1995).

Site 6: Elk's Club, 444 W. Alma Avenue. Hazardous concentrations of mercury in shallow soil were documented in 1994 at this parcel during Level II soil sampling and analysis activities. Investigations did not suggest evidence of groundwater contamination; therefore, groundwater was not sampled or analyzed. The SCVWD has recommended that the property owner remediate and document to SCVWD the approximately 7,780 cubic yards of soil contamination prior to property acquisition (SCVWD 1995).

Reach 9

One site with a potential for environmental contamination was identified in the vicinity of the Project limits within Reach 9. This property is proposed for acquisition for the Project.

Site 7: Golden State Builder and Farr Construction, 1891 Almaden Road. Aboveground storage tanks were identified at this parcel from aerial photographs. The owner refused to issue right of entry; therefore, Level II investigation was not conducted. The SCVWD has

recommended that a right of entry be obtained and a Level II investigation be conducted prior to property acquisition (SCVWD 1995).

Reach 10C

One reported release of hazardous materials was identified in the vicinity of the Project limits within Reach 10C. Portions of this property are proposed for acquisition for the Project.

Site C24: Valley View Packing, APN 455-12-07, 455-39-03 and 455-39-06. Previous investigations conducted at this facility have documented petroleum contamination in soil and groundwater associated with former USTs, as well as shallow soil contamination by pesticides and metals. Level II soil sampling and analysis conducted in 1994 showed pesticide contamination in soils above regulatory threshold limits in the upper 2 feet of soils in the northern portion of the soils, but subsequent testing in August 1995 did not confirm the presence of pesticides at hazardous waste levels. Metals were determined to be present at non-hazardous concentrations in soil (SCVWD 1995).

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Health and safety impacts are considered to be significant if humans may sustain potentially adverse effects from exposure to materials that occur directly or indirectly as a result of project construction. Hazardous materials may be present in soil and/or groundwater or may be brought to the project site during construction. The possible routes of exposure are inhalation, absorption through the skin, and ingestion.

Preferred Project

Introduction

Construction activities and acquisition of right-of-way for the Preferred Project have the potential to intercept contaminants from nearby hazardous materials release sites. Although the area is largely residential, the project corridor does include some industrial and commercial areas which could be sources of contamination.

A review of project vicinity land uses and environmental contamination research has indicated the potential for encountering hazardous materials during project construction activities. Surface and/or subsurface contamination may have resulted from site use within the area of proposed construction, or as a result of contaminant migration through subsurface pathways from off-site sources. Table 4.4-1 summarizes identified reported releases of hazardous materials where additional investigation and/or remediation is recommended. Figure 4.4-1 shows the locations of these reported releases.

Beneficial Impacts

The identification and remediation of potentially hazardous materials release sites is regulated by various state, regional, and local agencies. The ongoing abatement of known

Beneficial Impacts

The identification and remediation of potentially hazardous materials release sites is regulated by various state, regional, and local agencies. The ongoing abatement of known hazardous materials release sites would not be significantly affected by this project. However, the acquisition of properties within the project site has, and will continue to, trigger the need for hazardous materials site assessments. These investigations have hastened the detection and cleanup of soil and groundwater contamination and have resulted in beneficial impacts to surface and groundwater quality.

Less-than-Significant Impacts

Contaminant Migration from Groundwater to the River. The majority of the reported releases are not within the project area. Contamination from these reported releases of hazardous materials would reach the project area only by subsurface migration through groundwater. Depth to groundwater in the area has historically been well below the existing and proposed streambed. Therefore, there exists no significant contaminant exposure pathway during operation of the Preferred Project.

Six reported releases of hazardous materials are located within the Preferred Project (Table 4.4-1). Assuming that all mitigation measures outlined for construction impacts (HM-1) are implemented, there would be no significant contaminant exposure pathway within the boundaries of the completed project.

Potential Acquisition of Sites Requiring Contamination Investigation or Clean-up. During right-of-way acquisition, the District may require purchase of real property contaminated with hazardous materials. California law states that the discharger, or property owner if a discharger cannot be identified, is responsible for evaluation and remediation of a property contaminated with hazardous materials. A total of 194 parcels (183 residential and 11 commercially-developed) are proposed for acquisition (SCVWD 1992). There are eight identified active contamination sites within the Preferred Project that are proposed for acquisition, including three sites with documented groundwater contamination (Sites 3, 4, and C24). Additionally, there exists the potential for contaminant migration through subsurface pathways from undocumented off-site sources into areas of property acquisition.

If subsurface contamination were encountered during project construction, the District would be responsible for the evaluation and/or remediation of the contamination unless a responsible discharger could be identified and the District could postpone construction until investigation and cleanup were performed by another party. Investigations may include characterization of contaminated soil and/or groundwater, excavation and disposal or on-site treatment of contaminated soils, pumping and treatment or disposal of contaminated groundwater, continued monitoring/sampling of groundwater, and reporting of site characterization/remediation activities to the appropriate local, state and/or federal regulatory agencies. It is District policy that any identified sites be fully remediated before the property is acquired. The time to fully remediate contaminated groundwater may range from months to years.

Construction Impacts

Impact HM-1: Construction Activities Could Result in Exposure of Soils or Groundwater that Contain Hazardous Materials. Proposed construction activities related to the Preferred Project include channel widening, bench and levee construction, repair of erosion sites and construction of bridges, maintenance roads and bypass channels at various locations within the project area. These activities may require excavation and dewatering, which may expose or otherwise encounter hazardous materials. Specific project impacts resulting from encountering hazardous materials during project activities include potential exposure of workers to toxic materials, further contamination of soil and/or groundwater, and project schedule delays and budgetary impacts as a result of characterization, removal and/or disposal of hazardous materials.

The potential for reported releases of hazardous materials to impact project construction activities depends on several factors including: location of the reported release relative to proposed construction activities; the nature of the reach-specific construction activities; the source, nature and extent of contamination; the impact to groundwater of the reported release; and the hydrogeologic conditions in the vicinity of the reported release (such as soil permeability, transmissivity and depth to groundwater).

Due to the variability in local groundwater flow direction and lack of site-specific contamination and hydrogeologic data, specific impacts to soil and/or groundwater at a given location as a result of nearby contaminant releases cannot be determined. In addition, there is a potential for encountering hazardous materials associated with unreported releases. The following subsections discuss the potential for impacts to the proposed construction activities at each project reach resulting from reported releases of hazardous materials.

Reach 7. Six reported releases of hazardous materials were identified along Reach 7 at properties proposed for construction activities. Project construction activities at this section of Reach 7 include construction of a stepped gabion bypass channel and a bridge or culvert at Alma Avenue. Assuming that all mitigation measures outlined for construction impacts (HM-1) are implemented, there would be no significant potential for intercepting subsurface contamination from the documented reported releases of hazardous materials. The time required to fully remediate contaminated groundwater at sites 3, 4, and C24 may range from months to years. Therefore, if Project construction activities at these sites require excavation below the water table and begin prior to full remediation of contaminated groundwater, there is a high potential to encounter contaminated groundwater during Project construction.

Reach 8. No reported releases of hazardous materials were identified along Reach 8 within 500 feet of the River. There is low potential for intercepting subsurface contamination resulting from reported releases of hazardous materials along this reach.

Reach 9. One property was identified within Reach 9 with aboveground storage tanks (Site 7, Golden State Builder and Farr Construction, 1891 Almaden Road). Proposed Project construction activities in this area include channel widening. Assuming that all mitigation measures outlined for construction impacts (HM-1) are implemented, there would be no

significant potential for intercepting environmental contamination from a release of hazardous materials at this site.

Reach 10C. One active contaminant investigation (Site C24, Valley View Packing, 1095 Hillsdale Avenue) was identified within Reach 10C. Soil and groundwater contamination have been documented at this site. Depth to groundwater at this site in 1993 was reported to be approximately 35 feet below the ground surface. Proposed construction activities in the vicinity of this site include:

- Excavation of the existing channel bottom beneath the Hillsdale Avenue Bridge (approximately 25 feet below existing grade)
- Removal of the Hillsdale Avenue Bridge
- Construction of depressed maintenance road and bank ramps
- Construction of floodways, cribwalls, and stepped gabions
- Channel widening and revegetation

Proposed construction excavation activities to be conducted at the Valley View Packing facility and adjacent orchards have a high potential to expose or otherwise encounter contaminated soil. Based on 1993 data, the proposed depth of existing channel excavation is 10 feet above groundwater. The potential is very low for proposed construction activities to intercept contaminated groundwater materials released from the identified site. Should groundwater levels rise significantly before or during project construction activities, the potential may increase for intercepting subsurface contamination. Assuming that all mitigation measures outlined for construction impacts (HM-1) are implemented, there would be no significant potential for intercepting subsurface contamination from the documented reported releases of hazardous materials.

Impact HM-2: The Proposed Project Could Affect the Investigative and/or Remedial Activities Conducted at Contaminated Sites Reported Within the Project Area. Project activities that could affect the rate of surface water recharge into the groundwater, such as changes in surface permeability and the creation of water bodies (wetlands or ponds), could affect groundwater gradients in the vicinity of the project. Changes to groundwater gradients may affect contaminant plumes at contaminated sites within the vicinity of the project. Additional site investigations may be required at contaminated sites to hydraulically contain and capture the contaminated groundwater for treatment.

Three sites with documented groundwater contamination have been identified at locations where flood control facilities would be constructed (Sites 3, 4, and C24: Table 4.4-1). It is possible that project construction may affect the investigative or remedial activities at these sites, including destruction of previously installed groundwater monitoring wells.

The District would evaluate the potential impacts to groundwater levels and hydraulic gradients at the sites during the design phase. The design phase would precede the construction phase by a minimum of one year, which would allow adequate time to review

the status of known contaminated sites and to evaluate any new sites. The site evaluation would include a review of available site-specific information and proposed construction activities for each reach. The District would evaluate existing groundwater and soil quality, distance from project facilities, the nature and extent of contamination on-site, contaminant pathways, groundwater levels and flow directions, and active investigations or remedial activities. This information would be evaluated to assess pre-construction groundwater conditions and to evaluate the potential net effect on groundwater recharge caused by proposed flood control facilities.

Impact HM-3: Building Demolition Could Encounter and Release Asbestos. Approximately 137 residential and commercial buildings would be demolished as part of the Preferred Project. Some or all of these structures may have been built prior to the early 1970's when construction with asbestos-containing materials (ACMs) was discontinued. Demolition activities could release asbestos fibers, potentially exposing construction workers and bystanders to a health hazard. Disposal of demolition-derived ACM waste not in accordance with local, state and federal regulations could result in legal action against the District and/or the demolition contractor.

Mitigation Measures

Mitigation Measure HM-1: Conduct Site Investigations and Remediation and Waste Disposal in Accordance with Applicable Laws and Regulations.

- Conduct Level I and Level II hazardous material investigations to identify and delineate extent of hazardous material contamination with the project limits and evaluate potential impacts to project construction.
- Conduct property preacquisition investigation for hazardous materials to ensure the contaminated properties are properly identified and remediated by the property owners prior to acquisition to minimize hazardous material impacts to project construction.
- Remove hazardous materials within project limits prior to construction to minimize impacts to project construction.
- Obtain acceptance from a proper disposal facility for soils that contain elevated concentrations of chemical contaminants but are not classified as hazardous waste soil.
- Obtain necessary permits to discharge and provide treatment prior to discharge of contaminated groundwater encountered during construction.
- Inform the contractor of the presence of potential hazardous materials within project limits so that proper health and safety measures can be provided by the contractor to the construction workers.
- Prepare construction specifications for the proper management of hazardous materials encountered during construction.

Mitigation Measure HM-2: Monitor Groundwater Gradients and Migration of Contaminant Plumes at Contaminated Sites in the Vicinity of the Project Site to Determine if Project Construction Has Adversely Affected Site Characterization and/or Remediation Activities. If groundwater monitoring data indicates that the project would impact the investigative and/or remedial activities at a site, the District would develop and implement a mitigation plan for each specific site. The mitigation plan would ensure that potential impacts to the investigation and/or cleanup of contaminated sites from the project are properly identified, monitored, and minimized. A site-specific mitigation plan may include some or all of the following elements, depending on specific site conditions:

- Perform periodic review (e.g., quarterly) of reports submitted to regulatory agencies as part of the investigation or cleanup at the site
- Review depth-to-groundwater information from available groundwater monitor wells within the site vicinity
- Construct groundwater monitor wells between the site and Guadalupe River to monitor and evaluate changes to groundwater conditions as a result of the project construction
- Modify flood control design or develop appropriate control measures to minimize impacts to investigation and cleanup of adjacent contaminated sites
- Develop and implement additional mitigation measures, should the results of monitoring after project construction indicate that the project is adversely affecting the investigative and/or remedial activities at a site

As an added precaution and on an as-required basis, several of the preconstruction groundwater monitoring wells would be sustained in order to document groundwater conditions before, during, and after construction. This information would be used to evaluate any potential impacts from the project to groundwater conditions in the project vicinity. The preconstruction groundwater monitoring wells would be constructed as part of the geotechnical investigation during the design phase of the project.

Mitigation Measure HM-3: Conduct Asbestos Inspections and Removals. As specified in the District's Property Management Plan, structures would be inspected for the presence of ACMs prior to demolition. If present, ACMs would be removed by an Asbestos Hazard Emergency Response Act (AHERA) certified and licensed asbestos removal contractor. The ACM waste would be disposed of at a facility legally permitted to accept asbestos waste. Emissions of potential asbestos-containing dust would be controlled during demolition in accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2.

Residual Impacts After Mitigation

District[1] adherence to local, regional and state laws and guidelines regulating the identification and remediation of hazardous materials and implementation of mitigation measures recommended in this EIR/EIS should reduce potential impacts from hazardous materials to an insignificant level.

Minimize Vegetation Impacts Alternative

Potential impacts and recommended mitigation measures for the Minimize Vegetation Impacts (MVI) Alternative would be slightly greater than those identified for the Preferred Project. More soil excavation would be required for the bypass channel and maintenance road, which could result in workers encountering contaminated soil or groundwater from reported or undocumented hazardous waste release sites. At the Valley View Packing Plant in Reach 10C, excavation of the east bank and construction of a depressed maintenance road would likely extend into the area of documented soil contamination and result in destruction of up to five existing groundwater monitoring wells, adversely impacting ongoing site characterization and/or remediation activities. The 300-foot right-of-way would also incorporate a portion of the area of documented organochlorine pesticide soil contamination in the orchards adjacent to (north of) the packing plant buildings. The increased right of way associated with the MVI Alternative would result in an additional 115 buildings to be demolished, increasing the demolition-related asbestos impacts. Implementation of the mitigation measures specified in this EIR/EIS should reduce potential impacts from hazardous materials to an insignificant level for the MVI Alternative.

No Project Alternative

Under the No Project Alternative, existing residential uses adjacent to the River would remain. Unauthorized disposal of refuse and household hazardous materials by residents would continue. The District should implement a community education program to discourage residents from disposing of wastes in the River.

[1] Or previous property owner, discharger, or other responsible party.

4.5 LAND USE AND GENERAL PLAN CONSIDERATIONS

Affected Environment/Setting

Existing land uses in the vicinity of the Guadalupe River Flood Control Project area include agricultural, industrial, commercial, residential, and open space uses (Figure 4.5-1). Residential uses dominate, occupying about 70 percent of the project area. However, commercial and industrial uses predominate along both ends of the project corridor within Reaches A and 12. A reach by reach description follows.

Reach A

The San Jose International Airport is the predominant land use in this reach, occupying the entire length of the west bank of the Guadalupe River. Parking lots serving the airport extend along both the east and west sides of the River in the northern portion of the reach. State Route (SR) 87, the Guadalupe Parkway, borders the east side of the River. Along the reach's southern half, there is a residential area east of the Parkway.

Reach 6

The land uses along the River are equally split between residential on the east bank and transportation systems on the west bank. The residential uses are almost entirely single family - medium density. Housing is built on one-eighth acre lots along McLellan Avenue and Palm Street. SR 87 is parallel to the west bank of the River. Interstate 280 crosses this reach at its northern end, while the Southern Pacific Railroad (SPRR) right-of-way traverses it diagonally from northwest to southeast at its southern end.

Reach 7

This reach is bound by the SPRR right-of-way to the north and the Union Pacific Railroad (UPRR) right-of-way to the south. The entire west bank is dominated by residential uses. Seventeen of the residential parcels on the west bank have a District maintenance easement passing through them. A half-acre District parcel abutting West Alma Avenue, on the River's west side is actively used as a neighborhood garden (the Willows Community Garden). North of Willow Street, the River is flanked by a mixture of residential and light industrial uses. East of the River, between Willow Street and West Alma Avenue, Lelong Street parallels the River, separating the riparian corridor from the SR 87 corridor. The 140-foot wide easement between Lelong Street and the River is under jurisdiction of the State. The Tamien light rail transit station was recently completed on the east bank of the River just west of Alma Avenue.

The San Jose Elks Club is on the parcel south of West Alma Avenue on the east bank. Commercial uses occupy the west side of the River just south of West Alma Avenue, while multi-family residential uses are found along the UPRR tracks just west of the District easement. The River corridor is vegetated throughout the length of this reach.

Reach 8

The River is largely bordered by single-family residential uses in this reach. The District easement on the west bank runs south from the UPRR right-of-way for 700 feet and terminates at a residential parcel. The easement precludes development within its 60-foot width (as measured from the centerline of the River). The District's easement on the east bank parallels the River for 200 feet with a 50-foot width, ending at residential properties in both directions. Homes adjoining the River are well-maintained and occupy one-quarter to one-eighth acre lots. Homes on the east side of the River give the appearance of a residential island, bounded by SR 87, the River, a railroad right-of-way to the north and commercial activity south of Northern Road.

Reach 9

A combination of residential uses and vacant lots characterize this reach of the River. Single-family residential housing on one-quarter-acre lots predominates along the River's west bank, particularly between Willow Glen Way and Malone Road. South of Malone Road to Curtner Avenue, there are ten half-acre lots which back on the channel.

A San Jose Water Company well field is located on the east bank at Willow Glen Way. Its land slopes in grassy, tree-covered terraces to the River. Property just south, adjoining the same bank, is also well-vegetated, displaying an attractive variety of natural and introduced ornamental plantings. The District owns land parallel to this property, largely on the River's west bank, where a number of significant bank stabilization measures have been undertaken to control scour erosion. Almaden Road parallels the east bank south of the well field.

Reach 10

The County owns land immediately adjacent to the River's east bank between Curtner Avenue and the Almaden Expressway (Reach 10A). However, a parking lot of the Willow Glen Shopping Center dominates the wedge-shaped property in this area, as does the billboard at Old Almaden Road. The west bank of this section of the River is occupied predominantly by residential properties, many of which encroach on the River channel with backyard terraces and decks.

In Reach 10B, the District owns lands on the west bank adjacent to the Almaden Expressway. The District's property continues south of the Expressway on the same side of the River. The land sandwiched between the east bank of the River and the northbound lane of the Expressway is also under the jurisdiction of the District. Beyond this lane are residential and commercial uses, while west of the southbound Almaden Expressway are residences and a neighborhood park.

A large area of vacant land bordered by Skylark Road and Wren Drive to the north would be revegetated by District as a mitigation area. South of this vacant parcel on the east bank of Reach 10C is the old Valley View Packing Plant site. Recognized as having some historical importance, the 48-acre parcel is planned for high density residential and combined industrial/commercial uses, although no development application has been submitted to the

FIGURE 4.5-1

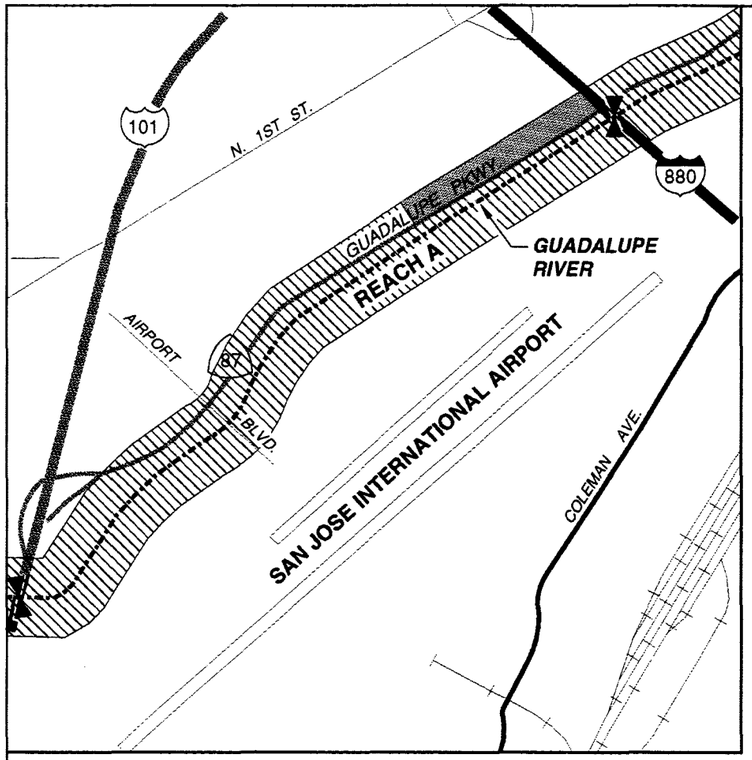
EXISTING LAND USES

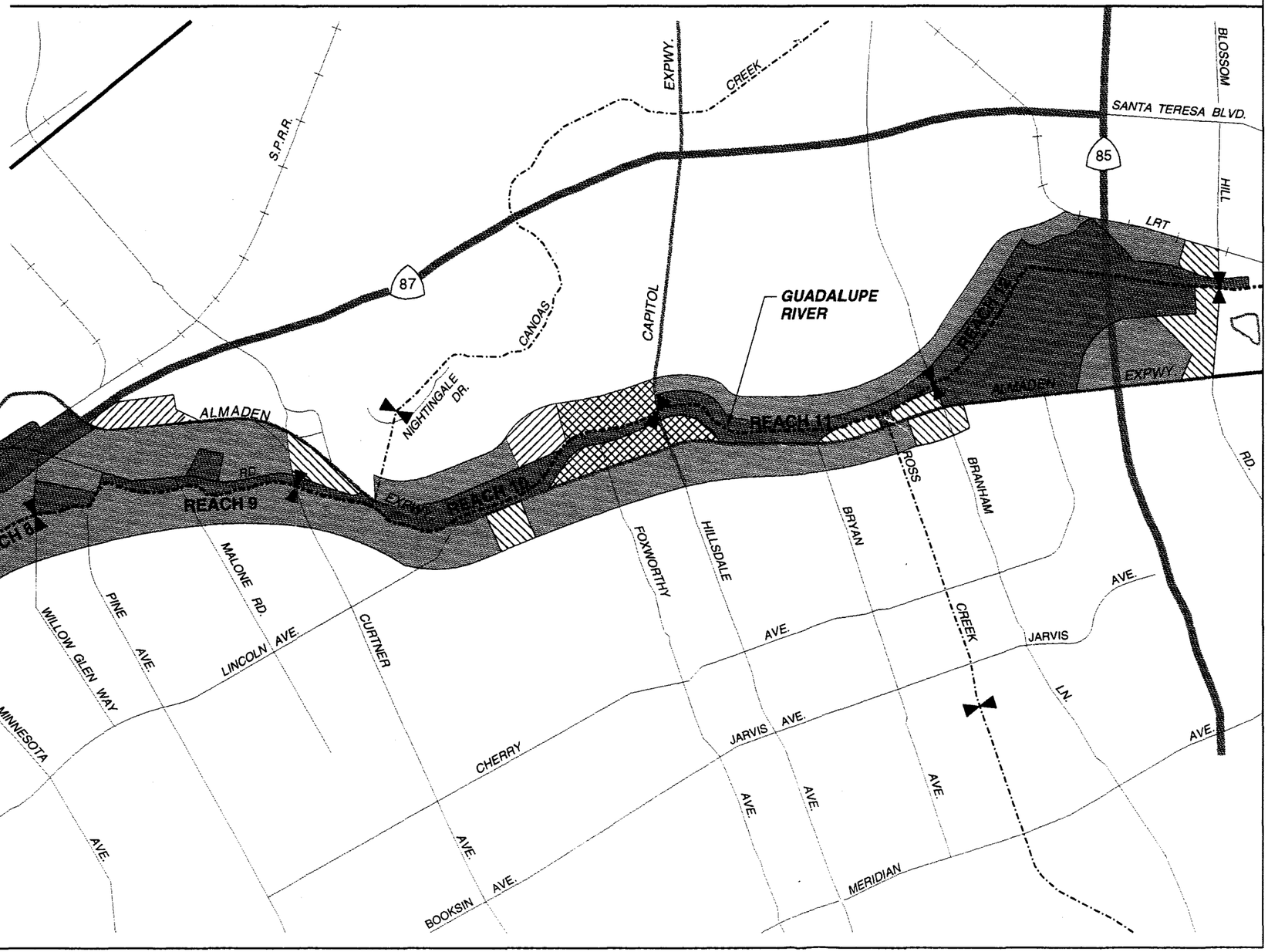
Guadalupe Flood Control Project

LEGEND

- RESIDENTIAL
- COMMERCIAL
- INDUSTRIAL
- COMMERCIAL / INDUSTRIAL
- EASEMENTS / VACANT / AGRICULTURE

0 1000 2000
SCALE IN FEET





REV.4 C337-06.DWG 04/29/94

ENGINEERING-SCIENCE

City of San Jose. The District also owns the majority of the west bank following along the Old Almaden Road. Adjacent to the east bank between Hillsdale Avenue and the Capitol Expressway, is a commercial car dealership, while on the west bank, the River is fronted by the Old Almaden Road.

Reach 11

This reach is bound by the Capitol Expressway to the north and Branham Lane to the south. The Almaden Expressway parallels the River on its west bank. The northern section of this reach is dominated by commercial businesses and car dealerships to the east and retail and commercial development to the west. The northeast side of the channel comprises land and easements held by the County and District. More than three-quarters of the east bank to Branham Lane adjoins residential uses. An existing path or access way, maintained by District, parallels much of this side of the River. The City of San Jose and the San Jose Water Company hold land that remains partially open along the middle of this reach (11B), between the River and Thousand Oaks Drive. The San Jose Water Company property extends across the River to the Almaden Expressway. This land is vacant except for cyclone cages which house well pumping equipment. Fronting the cul-de-sacs along the east side of the River extending to Branham Lane is a service road maintained by District. Ross Creek enters the River via a concrete culvert about 1,000 feet north of Branham Lane.

In Reach 11C, commercial property borders the west bank south of the Water Company land. The commercial facilities have service entrances which back up to the heavily vegetated river bank.

The reaches of both Ross and Canoas creeks within the project area have been channelized by prior flood control efforts. Residential uses abut these creeks on both banks, and homes are generally only 60 to 80 feet from the channel.

Reach 12

Office/commercial property borders the River in the northeast portion of this reach, which is bound by Branham Lane, Tonino Drive and a narrow strip of land that parallels the River owned by the District. The District's parcel follows the east bank for about 1,000 feet, becoming wider and more easily accessible. The District maintains a service road along the River. The River right-of-way managed by the District along both sides of the northern segment varies from 100 to 350 feet.

Residential properties are contiguous with the District's right-of way on the east side of the River for most of the length of the reach except for the commercial uses on both sides of the River along the reach's northern and southern edges. Most of the homes have enclosed back yards, with the exception of a few with landscaped terraces that lead down to existing informal paths. Midway along this reach, beside both the east and west banks of the River, the District has developed percolation ponds for groundwater recharge purposes. The two ponds on the western bank occupy an extensive area approximately 2,000 feet long and up to 350 feet wide. The overall District right-of-way in the southern segment of the reach varies

from 250 to 1,000 feet in width. On the east side of the River, adjacent the percolation pond, is a new residential subdivision.

The land bordering the northwestern edge of the reach is principally commercial, with minor industrial/commercial uses. The central two thirds of the western side of the reach are zoned for agriculture and are in production. This area, which is actively used to grow row crops such as beans, tomatoes, strawberries and corn, extends from the River to the Almaden Expressway. State Route 85, which occupies a 200-foot right-of-way, is under construction and crosses the reach via a 1,600-foot long bridge. Continuing south along the west side, Sanchez Drive stretches along the River beyond the commercial activity that fronts on Blossom Hill Road and the length of the percolation ponds beyond it. There are a number of townhouses and condominiums that were recently completed or are under construction beside Sanchez Drive.

Plans and Policies

The project area is within the city limits of San Jose, with a short segment of Reach 10 that borders County land. Accordingly, the City's Horizon 2000 General Plan would be applicable to the project area.

City of San Jose General Plan Policies

The Horizon 2000 General Plan (1994) seeks to balance the need to protect the community from the risk of flood damage (which is the primary goal for Flood Policies) with the protection of the City's remaining riparian corridors. Among San Jose's six flooding-related policies, one in particular is applicable: "New development should be designed to provide protection from potential impacts of flooding during the '1%' or '100-year' flood."

At the same time, the City seeks to protect riparian resources. The goal of the General Plan's Marine Life and Wildlife Resources section is to: "Preserve areas of special marine and wildlife habitation, particularly those containing endangered species, as living research and recreational resources, and as indispensable parts of the total environment."

Policy 5 states that: "Significant creeks and natural riparian corridors within the Urban Service Area should be preserved whenever possible. When disturbances cannot be avoided, appropriate measures should be required to restore, or compensate for damage to the creeks or riparian corridors."

Santa Clara County General Plan Policies

The Santa Clara County General Plan (1990) calls for a number of strong, protective measures in reference to creeks and streamside areas in its Natural Environment, Land Use, and Public Safety Elements. Its Natural Environment (NE) Element details eight policies that are relevant to the proposed project and for which the District shares responsibility with the County for proper implementation. They are as follows:

- The remaining riparian vegetation associated with the streams and creeks of Santa Clara County shall be protected through the following means:

a. By setback from the top of the bank

b. Regulation of the removal of trees and other vegetation

c. Reduction or elimination of the use of herbicides by public agencies

d. Controlling and designing of grading, road construction, and bridges near streams to minimize loss of riparian vegetation

- Public projects shall be designed to avoid damage to the stream environments.
- Where possible, riparian woodlands, marshes and flood plains which have been altered should be allowed to return to a natural state.
- In flood plains which are not already developed, land uses shall be restricted to avoid need for major flood control alterations to the streams.
- Flood control modifications to be made in streams that have substantial existing natural areas should use a flood plain design which avoids alterations of the creek and its immediate environments.
- Public projects should preserve the stream environment and should provide multiple use for such purposes as parks, open space preserves, trails and flood control
- Lands near creeks and streams shall be considered to be in a buffer area consisting of the following land:

  a. An area extending 150 feet from top bank line landward where the creek is predominantly in its natural state (has not been converted to a concrete or rip-rap channel).

  b. An area extending 100 feet from high water line landward where the creek has had major alteration, such as concrete or rip-rap channelization.

  c. If a. or b. above is not applicable, establish an area sufficient to protect the creek from negative influences of adjacent development such as sedimentation, biochemical degradation, thermal pollution and aesthetic degradation.

- Within these buffer areas, the following restrictions should apply to public projects and to private non-residential development:

  a. No building structure (except those required for flood control maintenance, reinforcement, or bridging, etc.) or major parking lot shall be allowed.

  b. No grubbing, clearing, tree cutting, grading, debris disposal, or any other despoiling action shall be allowed, except for removal of dead or diseased material after investigation has established that wildlife habitat of value for particular species will be retained.

c. Screen the buffer area from obtrusive or unsightly aspects of a project outside the buffer in a manner that will create a feeling of continuity with the buffer, being careful to protect the native plant communities.

d. Protect wildlife and endangered plant species within the area.

e. Provide for trails and other compatible recreational uses when indicated in the County or City General Plans.

The Implementation portion of the Element requests, among other provisions, that the District do the following: "Restore, when possible, riparian vegetation which has been lost through past actions." (NE(i) 19)

In addition, the Land Use (LU) Element of the Plan specifically provides for creek and streamside protection and restoration when possible, as well as the avoidance of "building, parking, clearing or despoliation within the creek buffer area." (LU 10) Allowable Uses are defined accordingly: "Creeks and streamsides shall be preserved in their natural state providing for drainage, percolation, wildlife habitat, aesthetic relief and open space. Recreational uses that are environmentally compatible are allowable within the creek buffer area." (LU 9).

The Public Safety (PS) Element considers flood control measures in the context of advancing other community goals, including "recreation, resource conservation, preservation of natural riparian vegetation and habitat, and preservation of the scenic values of the county's streams and creeks." (PS 21) It requires that flood control projects, whenever possible, "be designed to maintain creeks in their natural state." (PS 19)

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

The CEQA Guidelines indicate that a project will normally have a significant adverse land use impact if it will conflict with the adopted land use policies of the community where it is located. For the purposes of this DEIR/DEIS, the following are considered potentially significant land use and planning impacts: 1) a proposed use that could not be approved by the local agency (within its permitted discretion) because of conflicts with the General Plan land use designation where the project is located; 2) a proposed project that results in the conversion of public open space into urban- or suburban-scale uses; 3) a project that would disrupt or divide the physical arrangement of an established community; or 4) juxtapose incompatible land use types resulting in adverse physical impacts.

Preferred Project

Beneficial Impacts

The proposed project would result in the conversion of residential, commercial, and industrial land use to open space dedicated to flood control purposes. Regionally beneficial land use impacts would result from the project by creating a buffer along the River corridor.

Less-Than-Significant Impacts

When fences and other property barriers are removed, the project would result in short-term privacy and security impacts on homes adjacent to the construction sites. Another consequence of fence removal could be the escape of pets.

To mitigate this potential impact, temporary construction fencing would be installed to replace backyard fences removed during construction. This fencing would remain in place throughout the duration of construction and would provide security and privacy. Permanent fences would be repaired or replaced after project construction.

Inter-agency coordination would continue to assure that the recreational features and uses for the Guadalupe River Corridor Park would be incorporated into the flood control project design. Key representatives from the San Jose Department of Recreation, Parks and Community Services, the City of San Jose, and the District have been meeting and should continue to meet at the beginning of each design phase of the project to identify and reconcile potential differences and to maintain compatibility between the park master plan for the corridor and the corresponding elements of the flood control design. Compatibility with the appropriate policies of the City and County Land Use Elements related to discouraging the disturbance of riparian habitat by development and/or recreational uses would be retained by coordinating trail design with the San Jose Department of Recreation, Parks and Community Services. Whenever trail placement could adversely affect the habitat value of the riparian corridor, the trail would avoid those portions of the corridor sensitive to human intrusion. This issue is addressed in greater detail in the Biological Resources Section of this EIR/EIS.

The acquisition by the District of certain properties that are designated for commercial and industrial land uses in Reach 10C near the Capitol Expressway would result in a loss of land stock potentially available for light industrial and commercial uses. This would, however, be a less-than-significant impact, in view of the small acreages involved relative to the available supply of land.

Privacy issues related to the proximity of the project to the backyards of housing adjacent to the corridor represent a less-than-significant impact. Housing units are generally closer to the stream channel currently than they would be following the completion of the project.

Construction Impacts

Impact LU-1: Construction-related Nuisance Impacts to Local Residents. During construction, residences adjacent to the flood control project could be affected by the noise, dust and increased traffic hazards associated with the widening of the River channel and the construction of levees, bypasses, floodwalls and gabions, as well as the removal of homes. Single-family residential areas that would be temporarily disturbed by these indirect land use impacts include the following: 1) the Grant Street, Palm Street, McLellan Avenue, and Harliss Avenue neighborhood in Reach 6 of the project; 2) Mackey Avenue along Reach 8 of the River; 3) Almaden Road, Malone Road, and Guadalupe Avenue within Reach 9; and 4) the Thousand Oaks neighborhood in Reach 11. These classes of impacts, which are often

associated with "nuisances," are more thoroughly addressed in the noise, air quality, traffic, and public safety sections of this EIR/EIS.

Impact LU-2: Impacts of Interim Use of Properties Prior to Open Space Conversion. In developing a flood control project, the District typically demolishes all structures after completion of environmental review and project approval. However, the Guadalupe Flood Control Project would occur over an approximately 26-year period. The District proposes to phase demolition of the housing units that the District is acquiring to allow occupancy until at least two years prior to construction start-up. If the acquired structures are not suitable for habitation or use, or are not cost effective to repair, demolition would not be delayed. Whether or not demolition occurs, interim uses and management of a site must be in place to prevent the properties from becoming attractive nuisances or eyesores contributing to neighborhood deterioration.

Operational Impacts

Impact LU-3: Conversion of Residential Land Uses to Open Space. Implementation of the project would result in changes in land uses along the River corridor, specifically loss of residential uses. Completion of the project would require relocation of a total of 117 residences and 20 businesses. In October 1990, a Relocation Assistance and Last Resort Housing Plan for the project was submitted to the District. By the time the relocation plan was prepared, 58 residences and one business had voluntarily sold their property to the District and 59 residences and 19 businesses remained in the displacement area. By July 1993 additional owners had sold their property to the District. There remain 39 residences and 15 businesses to be relocated. The relocation plan was reviewed and updated in October 1993. It is not known when the Notices to Vacate would be issued; however, any project relocations that take place would be carried out according to the Relocation Plan (Santa Clara Valley Water District 1993[a]).

In some locales, notably wherever several residential units are situated together, the loss of housing would be perceived as a source of fragmentation or disruption of the residential character of the neighborhood. This potential effect would most likely occur in neighborhoods around McLellan Avenue and Mackey Avenue in Reaches 6 and 8, respectively, with the potential impact being a loss of community cohesion owing to the removal of 54 and 23 residential dwellings, respectively, along these streets.

In July, 1993, 25 of the 39 remaining relocation-eligible households were interviewed to determine household characteristics such as length of residency, number of occupants, and desire to relocate. Ten residents refused to be interviewed, three were never found at home, and one house was vacant. Ten of fifteen business owners were interviewed. The remaining five either refused to be interviewed or were never available when attempts were made to contact them. Information from these interviews is contained in the Relocation Assistance and Last Resort Housing Plan Review and Update, Guadalupe River Flood Control Project I-280 to Blossom Hill Road, Santa Clara Valley Water District, October 1993.

Mitigation Measures

Mitigation Measure LU-1: Implement Air Quality, Noise, Traffic, and Public Safety Measures to Mitigate Short-term Construction Impacts. To minimize the direct and indirect impacts associated with project construction, mitigation measures proposed for other sections of this chapter pertaining to air quality, noise, traffic, and public safety during the construction period should be implemented for the project and included as part of the construction contract documents.

Mitigation Measure LU-2: Implement Property Management Plan to maintain rental housing in the community and create attractive viable uses for vacant properties. The District has developed a Property Management Plan which contains guidelines for renting, demolition and interim use of properties acquired for the development of the Flood Control Project. The District's management and disposition process is outlined below:

- Determine if a structure is habitable or cost-effective to renovate;
- Select tenants for each rental property, based on District procedures; and manage the property to assure reasonable maintenance and continuity in the surrounding community;
- For each structure proposed for demolition, demolish in accordance with criteria that minimize environmental and community impacts; and
- Select interim uses for cleared lots in consideration of community needs, and needs of adjacent landowners and District.

The Property Management Plan outlines District rental procedures, rental property management, relocation, criteria for demolition of structures, and interim uses of cleared lots. The latter could include leaving sites vacant, expanding the yards of adjacent District-owned properties, establishment of community gardens, and use of commercially zoned lots for temporary uses such as Christmas tree sales. The Plan contains mitigation recommendations that address relocation of residents, management of demolition activities, and management of cleared vacant lots. Relocation is addressed in the District's Relocation Assistance and Last Resort Housing Plan. Building demolition is addressed in the Hazardous Materials, Public Services and Utilities, Traffic, Noise, Air Quality, Water Quality, Biology, and Cultural Resources sections of this environmental impact report. The latter are summarized below.

Properties that have been cleared of structures would be properly maintained to minimize disruptive effects on the community. The procedures outlined below have been adopted by the District for post-demolition property management and maintenance.

Fencing. The demolition contractor would install type CL-6 chain-link fence at all locations specified by the District.

Inspection and Vegetation Removal. After completion of site clearing and fencing, the properties would be inspected weekly. Trash and weeds would be removed on a weekly basis and damage to fences repaired. If the cleared lots were not properly maintained,

vegetation growth could present a potential fire hazard to neighboring structures. The SCVWD would conduct regular inspections of the sites and weeding and trimming of vegetation. In addition, as part of the maintenance program, materials dumped at the sites would be removed. Sites would be fenced to prevent trespassing.

Interim Land Uses. Coordinate with the City of San Jose's community garden program that assists neighborhoods in building and managing community gardens to develop community gardens on vacant lots as appropriate.

Coordinate with adjacent District tenants to allow temporary yard expansions onto cleared lots as appropriate.

Mitigation Measure LU-3: Coordinate with Affected Residents to Reduce Impact of Abrupt Changes to Neighborhoods. Refer also to Mitigation Measure S-1. In addition to the District providing relocation costs to displaced residents and other mitigation measures presented in the Socioeconomics section of this EIR/EIS, neighbors of the project and the affected households should be notified of the project, its importance, exact location in their vicinity, and locations of housing removal and its expected timetable -- by mail and by posted notice. Such notification should include a map of the affected area and take place at least three months and preferably six months before construction begins and should also include detailed street maps explaining future changes in traffic flow direction on McLellan Avenue in Reach 6, as well as the fact that Mackey and Guadalupe in Reaches 8 and 9, respectively, will remain at full lengths and widths. This notification is important to minimize the land use impacts to existing residents, particularly the loss of cohesiveness in the neighborhood. Coupled with community information meetings on the nature and expected results of the project, such communication would significantly reduce the potential impact of abrupt changes to residents' perception of the land uses in the immediate vicinity of the corridor.

Residual Impacts After Mitigation

Potential but insignificant impacts to homeowner privacy could be anticipated during construction. After completion, the Flood Control Project itself would have a positive impact on Land Use, because flooding risk would be reduced.

Minimize Vegetation Impacts Alternative

With creation of a bypass channel along some of the project reaches, this alternative would have slightly greater indirect land use impacts. Construction activity would require removal of 126 additional structures to accommodate the proposed bypass channel.

Impacts to proposed recreational uses along this corridor following completion of the Guadalupe River South Corridor Master Plan would be less than with the Preferred Project, because the plant canopy would be preserved and the habitat value of the natural stream enhanced. However, access would be more limited than the Preferred Project.

Mitigation measures recommended to reduce land use impacts of the Preferred Project would apply to the Minimize Vegetation Impacts Alternative.

No Project Alternative

No new land use impacts are anticipated if the No Project Alternative were implemented. However, the project area would continue to be subjected to flooding and new development would continue to be subject to floodplain management criteria.

4.6 SOCIOECONOMICS

Affected Environment/Setting

Population and Labor Characteristics

The City of San Jose is the urban hub of the South Bay Region. With a 1990 population of 782,250 people, it is not only the largest city in Santa Clara County, but also represents the largest single city in the San Francisco Bay Region. As illustrated by Table 4.6-1, the population of the City dramatically increased in the two decades following World War II. The growth rate of San Jose began to taper off from an average of 4 percent per year in the 1970 to 1980 period, to an average of 2.4 percent per year increase in the decade between 1980 and 1990. Projected population for the City to the year 2010 is shown in Table 4.6-2.

TABLE 4.6-1

HISTORIC POPULATION GROWTH IN SAN JOSE, SANTA CLARA COUNTY, AND THE SAN FRANCISCO BAY REGION (1950 - 1990)

Area	1950	1960	1970	1980	1990
City of San Jose [1]	95,280	204,196	445,779	628,283	782,248
Santa Clara County	290,547	642,315	1,064,714	1,295,071	1,497,577
San Francisco Bay Area	2,681,322	3,638,939	4,628,199	5,179,759	6,020,147

	Change in Population			
	1950-1960	1960-1970	1970-1980	1980-1990
City of San Jose	114.3%	118.3%	40.9%	24.5%

(1) Population within city limits.

Source: U.S. Census Bureau, 1995; ABAG, 1995.

The City's primary employment sectors are depicted in Table 4.6-3. Approximately three-fourths of Santa Clara County's manufacturing industry is high technology related. Manufacturing and wholesale make up 26.6 percent of total employment, while the service sector makes up about 34.7 percent of the available jobs. The retail trade sector is the City's third largest employer, amounting to 17.1 percent of the City's total employment in 1990.

TABLE 4.6-2

PROJECTED POPULATION IN SAN JOSE, SANTA CLARA COUNTY, AND THE SAN FRANCISCO BAY REGION (1990-2010)

	Actual	Projected	
Area	1990	2000	2010
City of San Jose [1]	820,947	956,800	1,031,600
Santa Clara County	1,497,577	1,719,150	1,844,300
San Francisco Bay Area	6,020,147	6,931,300	7,539,600
	Projected Change in Population		
	1990-2000	2000-2010	
City of San Jose	16.5%	7.8%	

(1) Within city sphere of influence.

TABLE 4.6-3

EMPLOYMENT DISTRIBUTION SAN JOSE METROPOLITAN AREA (1990)

Section	Percent of Total
Manufacturing and Wholesale	26.6
Services	34.7
Retail Trade	17.1
Agriculture and Mining	0.6
Other	21.0

Because of the large base of employment opportunities and the diversity of skill levels and occupational opportunities in the City's industries and services, unemployment in San Jose has historically been low relative to California as a whole. Between 1990 and 1995, the City's annual average unemployment varied between a low of 4.7 percent in 1990 and a high

of 8.1 percent in 1992. In 1995, the annual average unemployment rate was 5.8 percent (State Employment Development Departments 1996).

The City has a labor force of about 425,600 people, which is 52.4 percent of the total population of San Jose (ABAG 1995, CDF 1993). This is equivalent to approximately one worker per 2.0 residents. The City's ethnic profile among workers is diverse. According to the City's Office of Economic Development, approximately 50 percent are white, 5 percent are African-American, 26 percent are Hispanic, and 19 percent are Asian (primarily Filipino, Chinese and Vietnamese). (U.S. Census 1990)

Current Housing Stock and Recent Housing Growth

In 1995, San Jose had 265,028 housing units (CDF 1993). Of these, approximately 350, or 0.13 percent, are immediately adjacent the Guadalupe River Flood Control Project corridor. The City's housing stock increased about 10,050 from 1985 to 1990, or 2,010 per year on the average. This represents a 4 percent increase in housing stock over a five-year period (ABAG 1989, U.S. Census Bureau 1990).

The majority of the project area homes were constructed in the 20-year period immediately following World War II. There has been little new residential construction in the project area in the past 15 years. The economic cycle for many of the properties is on the decline.

Many single-family units have been converted to multi-family dwellings and new businesses have been established on the borders of the project area. Housing units in the project area are generally in average to good condition; while most dwellings are structurally sound, some of the buildings reveal slight to significant lack of maintenance.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Appendix G of the CEQA guidelines states that a project will normally have a significant socioeconomic effect if it will displace a large number of people or disrupt or divide the physical arrangement of an established community.

Preferred Project

Less-Than-Significant Impacts

The project would affect temporary employment but is unlikely to affect direct permanent employment. Direct employment impacts refer to permanent jobs generated by a project, while temporary employment effects are those associated with its construction phases. Operation of the flood control project would not generate any permanent jobs at the Santa Clara Valley Water District.

Project construction would generate 21,330 person-days of employment, which is equivalent to 112 person-years of employment, assuming a nine-month work season or an estimated 71

temporary construction-related jobs (Cheong 1996). This employment impact is not considered a significant countywide employment impact on the construction labor market.

The project could have secondary employment effects. There are two types of secondary employment resulting from any large project, indirect and induced employment. The indirect employment resulting from the project consists of jobs generated by the expenditure of on-site businesses on goods and services, while induced employment is that work generated by the expenditure of direct and indirect employees on goods and services. It is assumed that this project would have no measurable indirect employment impacts, because neither its construction nor operation would involve the establishment of new employment-generating businesses.

The expenditures of project-related direct employees would be limited to temporary, construction-related employees. Induced employment generated by the project would thus be temporary and limited to the handling and sale of consumer goods and building supplies. Based on ABAG's 1987 Input-Output Model and Economic Multipliers for the San Francisco Bay, (updated March 1995), the project's construction activity would generate a projected 107 induced jobs.

Significant Impacts

Impact S-1: Direct Impacts on Housing Stock and Businesses. Implementation of the project would require the relocation of 117 residences (88 parcels of land) and 20 businesses from the project area. In October 1990, a Relocation Assistance and Last Resort Housing Plan was submitted to the District. By 1990, when the Relocation Plan was prepared, 58 residential property owners and one business had voluntarily sold their property to the District, and 59 residential properties and 19 businesses remained in the displacement area. The 1990 Plan determined that there were adequate resources available at that time to relocate all remaining households and businesses.

By July 1993, ten additional owners had sold their property to the District and the City of San Jose had evicted 10 sleeping room occupants because of zoning and health code violations, leaving 39 households to be relocated. By July 1993, 15 businesses remained in the relocation area. Because more than two years had elapsed since the 1990 Relocation Plan was prepared, the District commissioned the Relocation Assistance and Last Resort Housing Plan Review and Update, which was completed in October 1993. The update includes: 1) a review of the original Relocation Plan; 2) interviews with 25 of the 39 remaining households and 10 of the 15 remaining businesses in the displacement area; 3) an analysis of the housing needs of the residents who will be displaced; 4) a survey of the current local real estate market; 5) an estimate of the cost of relocating the remaining occupants; and 6) a review of ten randomly selected case files from completed relocations. The review of the randomly selected relocation files concluded that all persons received relocation information and relocation payments to which they were entitled.

Only 25 of the 39 relocation-eligible dwelling units residents were interviewed because ten residents refused to be interviewed, three were never located and one house was vacant. Of

the fifteen businesses identified, five owners either refused to be interviewed or were not available.

The interviews revealed that the typical remaining displacement resident in the McLellan/Palm Street relocation development areas is Hispanic (69 percent), a homeowner (56 percent), and has lived in the current dwelling for more than ten years (89 percent). Fifty-seven percent of the renters in this area have lived in their homes for over ten years. One-half of the 25 interviewees feel strongly that they do not wish to move.

The typical resident of the Mackey/Malone/Almaden Road area is Caucasian (56 percent), a homeowner (56 percent), and has lived in the current residence for an average of 22 years. One homeowner had lived in the same home for 43 years. Eighty percent of the residents in the Mackey/Malone/Almaden Road area have lived in their home more than ten years. Twenty-five percent of the renters (tenants) have lived in the same home for over ten years. One tenant reported 35 years at the same address. Three years was the briefest period of tenancy. Tenants are typically paying significantly lower rents than those advertised in the San Jose area, and rent supplements are likely for approximately 90 percent of the tenants. Purchase differentials are likely to be necessary for at least ten percent of the homeowners and may be necessary for all.

Impacts to displaced residents and business owners of the project area would be significant to individual residents who have no desire to leave their present homes/ businesses or for whom moving would be a burden because of age or physical health. The total number of persons who have been or would be displaced by the project is not available at this time. Household size for the 25 households interviewed in the 1993 Relocation Assistance and last Resort Housing Plan Review and Update ranged from one to nine persons with the average household consisting of three to four persons.

Over the life of the project, a minimum of 300 residents and 20 businesses would be displaced (assuming a household size of 2.5, which is low for the area), including those that have already been relocated. This is considered a significant impact which can be mitigated to a level of insignificance by implementation of the relocation program. Disruption to the neighborhoods around McLellan Avenue could occur as a result of removal of 54 dwellings along this street. Operation of the project should not adversely affect the affordability of remaining housing in the project area. The District has prepared a Property Management Plan to address the impacts of interim use of housing which would be demolished, interim use of cleared lots of demolished housing, and the impacts of the demolition process. This Plan is addressed in the Land Use, Traffic, Noise, Air Quality, Public Services and Utilities, and Public Safety sections of this document.

Mitigation Measures

Mitigation Measure S-1: Provide Housing and Business Displacement Assistance. The District has instituted a Relocation Assistance and Last Resort Housing Plan for the flood control project (October 1990). This Plan provides a framework to provide for the consistent administration of acquisition, appraisal and relocation programs by the District for this project. Its relocation assistance and payment procedures should be strictly applied.

Information on relocation assistance is found in the District's Relocation Assistance Information guidelines, amended in 1989. This document is on file at the District and can be reviewed there. It is available for anyone who is eligible for relocation assistance. The District has two programs: the Relocation Advisory Assistance Program, and the Relocation Assistance Payment Program. These programs have been designed to implement the District policy that no person shall be displaced in connection with a District project unless and until adequate replacement housing has been provided.

Residual Impacts After Mitigation

While housing unit replacement would be assured by the District as part of its Relocation Assistance programs, the absolute number of housing units would still be reduced in the project corridor. In addition, while the 20 displaced businesses would be, or have been, moved, this represents a net diminution of business activity in the project area. However, because adequate replacement housing stock is available, and suitable locations for businesses exist, the long-term impact is not considered significant.

Minimize Vegetation Impacts Alternative

The Minimize Vegetation Impacts Alternative would involve the removal and relocation of 115 additional structures. Impacts to housing stock under the Minimize Vegetation Impacts would be similar to those of the Preferred Project, and the recommended mitigation measure would apply to this alternative.

The direct and temporary employment impacts would be approximately equivalent to those of the Preferred Project. Recommended socioeconomic mitigation measures would apply to this alternative.

No Project Alternative

No impacts are anticipated if the No Project Alternative were implemented.

4.7 TRAFFIC

Affected Environment/Setting

Transportation System

Roadway Network

The important streets in the project study area are shown on Figures 4.7-1 and 4.7-2. Figure 4.7-1 displays the northern part of the project corridor and includes Reaches 6 and 7 of the Guadalupe River. Figure 4.7-2 shows Reaches 8, 9, 10, and 11 in the central area of the project corridor. Proposed channel modifications in Reach A and Reach 12 would not affect traffic or circulation because no roadways in these reaches need to be closed or replaced and are not addressed in this analysis.

Regional access in the study area is provided by Guadalupe Parkway, State Route (SR) 87. Guadalupe Parkway in the vicinity of the project area is a four- to six-lane freeway that extends south to its junction with SR 85. North of the project area, Guadalupe Parkway is a four- to six-lane expressway/arterial that extends north to U.S. 101. The segment of Guadalupe Parkway that is currently an expressway (between Taylor Street and U.S. 101) will be upgraded to a six-lane freeway as part of the Route 87 freeway upgrade project.

Local roadways in the study area are described below. Land use and roadway geometric descriptions pertain to the immediate vicinity of the Guadalupe River.

West Virginia Street is a two-lane roadway lined with residential uses. West Virginia Street extends from Drake Street in the west to I-280 in the east.

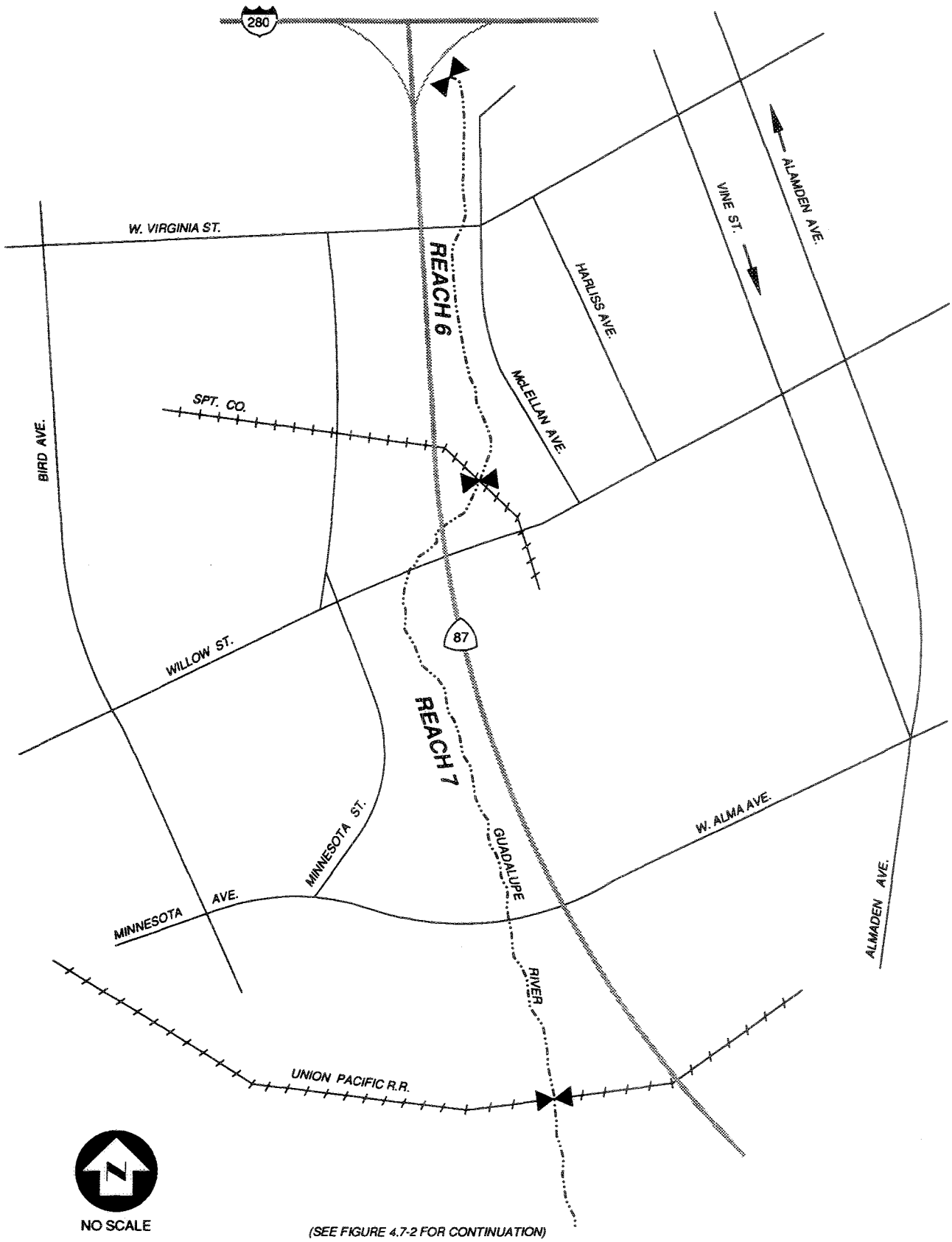
McLellan Avenue is a two-lane roadway; adjacent land uses are mainly residential. A few automotive businesses are located along McLellan Avenue. This roadway extends from Palm Street to Willow Street.

Willow Street is a two-lane roadway lined with residential and small business land uses. Willow Street extends from near Leigh Avenue in the west to Monterey Road (SR 82) in the east (Figure 1.1).

Alma Avenue is a four-lane arterial with multi-family residential, single-family residential, and small business land uses. Alma Street continues as Minnesota Avenue to the west, where it terminates at Meridian Road, and extends east to Senter Road.

Willow Glen Way is a two-lane roadway lined with residential uses. Willow Glen Way extends from Newport Avenue, near Lincoln Avenue, in the west to Almaden Road.

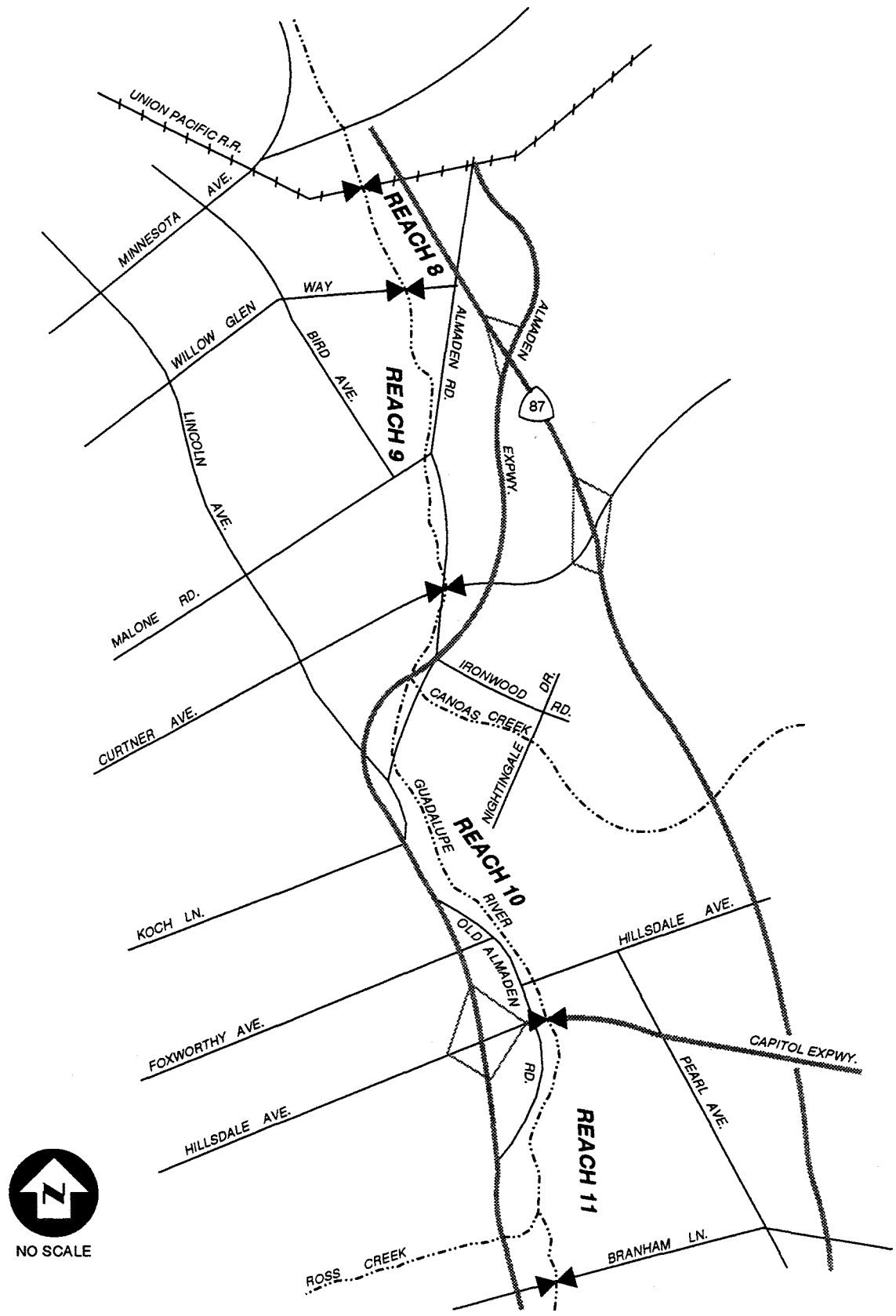
Malone Road is a two-lane roadway with residential uses adjacent to it. Malone Road extends from Cottle Avenue in the west to Almaden Road.



PROJECT AREA ROAD NETWORK

(REACHS 6 & 7)

(SEE FIGURE 4.7-1 FOR CONTINUATION)



PROJECT AREA ROAD NETWORK

(REACHS 8 THRU 11)

Curtner Avenue is a four-lane arterial lined with commercial and residential uses. Curtner Avenue extends from Camden Avenue, near State Route 17, to Monterey Road (SR 82) where it continues east as Tully Road (Figure 1.1).

Nightingale Drive is a two-lane residential roadway that extends from Apple Valley Drive (near Almaden Avenue) in the north to Blue Jay Drive.

Hillsdale Avenue is a two-lane roadway in an area with agricultural industry uses, warehouse, and other manufacturing uses. Hillsdale Avenue extends from Old Almaden Road in the west, jogs to the north at the Guadalupe River and continues east to just beyond Snell Avenue near Monterey Road (Figure 1.1).

Capitol Expressway is a six-lane arterial with commercial, business, and automotive retail uses. Capitol Expressway begins at Almaden Expressway as a continuation of Hillsdale Avenue and continues east and north into the City of Milpitas (Figure 1.1).

Almaden Expressway is a four- to six-lane major arterial with industrial, commercial, and residential uses. Almaden Expressway serves as a parallel facility to SR 87, and extends from Almaden Road near Alma Avenue to Harry Road in South San Jose.

Bus Service

Existing bus service throughout the county is provided by Santa Clara Valley Transportation Authority (SCVTA). Six bus lines cross the Guadalupe River on the following streets affected by this project.

Willow Street:	Line #25
West Alma Avenue:	Line #82
Curtner Avenue:	Line #26
Capitol Expressway:	Lines #37 and #70
Almaden Expressway:	Lines #37 and #64
Almaden Road/Ironwood Drive:	Line #67

Descriptions of these routes and their hours of operation are shown in Table 4.7-1.

Light Rail Transit Service

Located in the median of SR 87 (Figures 4.7-1 and 4.7-2) is the Guadalupe Corridor Light Rail line, operated by SCTVA. The line connects southern San Jose with downtown and northern San Jose with stations at Virginia Street, Alma Avenue (Tamien Station), Curtner Avenue, Capitol Expressway, and Branham Lane in the project area. Trains run every 10 minutes on weekdays during peak commute periods.

TABLE 4.7-1

EXISTING BUS SERVICE

Route #	Route Description	Hours of Operation[1]	Commute Period Headways (in minutes)[2]
25	East San Jose to De Anza College	5:00 AM to 12:00 Midnight	15-30
26	Eastridge to Sunnyvale/Lockheed	5:00 AM to 11:00 PM	20
37	Monterey and Senter to Bascom and Camden	6:00 AM to 7:00 PM	35
64	Almaden LRT Station to Alum Rock and Miguelito	5:30 AM to 11:30 PM	15
67	Monterey and Ford to Tamien LRT Station	6:00 AM to 6:30 PM	30-50
70	Milpitas to Capitol LRT Station	5:00 AM to 11:30 PM	15
82	Westgate to Hedding and 17th	5:30 AM to 9:00 PM	30

1 As of January 1996

2 Headways between 5:00 AM to 9:00 AM and 3:00 PM to 6:00 PM

Traffic Volumes

For this investigation, Barton-Aschman Associates, Inc. conducted traffic counts at one key intersection and at 11 key street segments potentially affected by construction of the proposed project. An intersection turning-movement count was made at the study intersection of Harliss Avenue and West Virginia Street on July 9, 1996. Twenty-four hour counts were made during the week of July 1, 1996, on the following street segments:

West Virginia Street, between Prevost Street and McLellan Avenue
McLellan Avenue, south of West Virginia Street
Willow Street, between Minnesota Avenue and Lelong Street
West Alma Avenue, between Belmont Way and Lick Avenue
Willow Glen Way, between Creek Drive and Northern Road
Malone Road, between Bird Avenue and Almaden Road
Curtner Avenue, between Coastland Avenue and Almaden Road
Almaden Expressway, between Almaden Road and Koch Lane
Nightingale Drive, between Ironwood Drive and Redbird Drive

Hillsdale Avenue, between Old Almaden Road and Pearl Avenue
Capitol Expressway, between Old Almaden Road and Pearl Avenue
Almaden Expressway, between Prosper Avenue and Branham Lane

Table 4.7-2 displays summaries of the street segment counts.

TABLE 4.7-2

EXISTING TRAFFIC VOLUMES

Street	Direction	No. of Lanes	Weekday Volume	Peak-Hour Volume	
				AM	PM
West Virginia Street	EB	1	2,073	74	182
	WB	1	1,974	115	139
McLellan Avenue	NB	1	170	9	20
	SB	1	239	7	28
Willow Street	EB	1	4,652	199	395
	WB	1	4,166	185	304
West Alma/Minnesota Avenue	EB	2	7,511	592	475
	WB	2	7,184	307	575
Willow Glen Way	EB	1	1,325	81	119
	WB	1	1,373	122	94
Malone Road	EB	1	3,607	157	373
	WB	1	3,548	225	280
Curtner Avenue	EB	2	8,926	602	609
	WB	2	8,372	497	613
Almaden Expressway, north of Koch	NB	3	24,396	3,917	1,192
	SB	4	27,701	899	2,813
Almaden Expressway, north of Branham	NB	3	21,747	3,240	1,124
	SB	3	21,801	875	1,904
Nightingale Drive	NB	1	600	49	46
	SB	1	395	17	36
Hillsdale Avenue	EB	1	3,181	143	289
	WB	1	2,968	361	222
Capitol Expressway	EB	3	17,738	752	1,508
	WB	3	17,835	1,383	1,152

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

CEQA Guidelines indicate that a project would have a significant impact on circulation if it causes a substantial increase in traffic in relation to the existing traffic volumes and capacity of the roadway system. For the purposes of this study, the following criteria are used to determine if additional traffic generated by the project would have significant impacts on the existing roadway system: (1) reduction of overall roadway or intersection level of service (LOS) to worse than D conditions (LOS E or F); and/or (2) temporary traffic delays that could result from roadway realignment or bridge removal and reconstruction.

Preferred Project

Beneficial Impacts

The Preferred Project would involve construction of a bypass channel parallel to, and immediately east of, the Guadalupe River in reaches 6, 7, 8, and 11A.

Reach 6. In Reach 6, this channel would displace approximately 54 single-family homes, one partial backyard area, and eliminate two blocks of city street. The reduction in residences would cause a reduction of approximately 540 daily trips in and out of the area surrounding McLellan Avenue. During the PM peak hour, approximately 43 fewer trips would use the neighborhood streets. This traffic would be transferred to the areas where the families are relocated.

The intersection of McLellan Avenue and Edwards Avenue would be eliminated by construction of the bypass channel. The District would realign the southern portion of McLellan Avenue to the east to connect it with Harliss Avenue, thus maintaining two-way access to the remaining homes at the southern end of McLellan Avenue.

Project plans show the proposed removal of McLellan Avenue, which crosses Virginia Street about 130 feet west of Harliss Avenue (measured between centerlines). Minor alteration of the T-intersection of Harliss Avenue and Virginia Street is proposed. The existing alignment of these two intersections is not ideal, in terms of the safety of operation. A minimum of 150 to 175 feet is more desirable between any two residential street intersections. Removal of McLellan Avenue and realignment of the Harliss/Virginia intersection would have a positive effect on traffic flow by preserving a T-intersection that is not flanked by another intersection. No mitigation measures would be necessary.

A peak-period intersection count revealed that 45 vehicles use Harliss Avenue in the peak hour from 4:30 PM to 5:30 PM on a typical weekday, and 342 vehicles travel east and west on Virginia Street between the two intersections. These are moderate volumes, reflecting little possible traffic congestion and thus a high level of service.

Reach 8. In Reach 8, 23 homes on the west side of Mackey Avenue would be removed. Removal of residences would cause a reduction of approximately 230 daily trips in and out of the area surrounding Mackey Avenue. Willow Glen Way would experience approximately

18 fewer trips during the PM peak hour. The traffic would be transferred to the areas where families are relocated.

Reach 9. In Reach 9, six homes, two partial backyard areas, and two businesses would be removed. The project would cause a reduction of trips in this area, which would reduce neighborhood traffic. This reduction in traffic is a beneficial impact.

Construction Impacts

Impact T-1: Construction Traffic Impacts Related to Bridge and Culvert Construction. Bridge construction would be required as part of the project and some streets would be closed temporarily, causing traffic diversions through some residential neighborhoods. Five bridges and four culverts would be affected by the project either by removal or new construction (Table 4.7-3). The existing river crossings at Malone Road and Capitol Expressway are not included in Table 4.7-3 because the bridges are compatible with the project and would not be modified by the project.

TABLE 4.7-3

BRIDGE AND CULVERT CONSTRUCTION PLAN

Bridge	Reach	Preferred Project Construction
Virginia Street	6	New bridge over new bypass channel, east of existing river bridge*
Willow Street	7	New bridge over new bypass channel, east of existing river bridge*
West Alma Avenue	7	New bridge over new bypass channel
Willow Glen Way	8/9	Replace existing river bridge with new bridge*
Curtner Avenue	10	Replace existing river bridge with new bridge
Hillsdale Avenue	10	Remove only after Pearl Avenue bridge is constructed
Almaden Expressway	Ross Creek	Enlarge box culvert for Ross Creek flow
NB Almaden Expressway	Canoas Creek	Add additional box culvert for Canoas Creek flow
Nightingale Drive	Canoas Creek	Add additional box culvert for Canoas Creek flow

* Requires street closure during construction.

The critical or highest hourly volumes on every street crossing the Guadalupe River (from north to south) between I-280 and Branham Lane are shown in Table 4.7-4. Depending upon the particular month and year of project construction, these volumes could be somewhat higher due to gradual traffic increases over time. The annual growth rate used by the Transportation Division of the City of San Jose is 3.6 percent.

TABLE 4.7-4

AFFECTED TRAFFIC ARTERIES

Street	Temporary Bridge Closures Required?	Direction	Critical Peak-Hour Volume	# of Lanes	Typical Capacity	Unused Capacity
Virginia Street	Yes	EB	200	1	750	550
		WB	150	1	750	600
Willow Street	Yes	EB	400	1	750	350
		WB	300	1	750	450
West Alma Avenue	Yes	EB	600	2	1,500	900
		WB	600	2	1,500	900
Willow Glen Way	Yes	EB	100	1	750	650
		WB	100	1	750	650
Malone Road	No	EB	400	1	750	350
		WB	300	1	750	450
Curtner Avenue	Partial*	EB	600	2	3,200	2,600
		WB	600	2	3,200	2,600
Almaden Expressway, north of Koch	No	NB	4,000	3	5,700	1,700
		SB	3,000	4	7,600	4,600
Almaden Expressway, north of Branham	No	NB	3,250	3	5,700	2,450
		SB	1,900	3	5,700	3,800
Nightingale Drive	Yes	NB	600	1	750	150
		SB	400	1	750	350
Hillsdale Avenue	Yes	EB	300	1	750	450
		WB	350	1	750	400
Capitol Expressway	No	EB	1,500	3	5,700	4,200
		WB	1,400	3	5,700	4,330

* Bridge replacement stages with two lanes open at all times.

Peak-hour volumes are the key volumes used to analyze traffic impacts. Daily volumes are important, but the traffic volumes crossing the bridges during the two commute periods each weekday have the greatest effect on levels of service. The relationship between peak-hour and daily volume can vary considerably.

It was not possible to analyze all possible combinations of bridge closings. The following discussion considers the most likely combination of bridge closures given the District's proposed construction plan and phasing schedule. To assess whether a particular bridge street could accept traffic diverted from closed adjacent bridges, the typical capacity of each link is addressed (Table 4.7-4). These capacities were derived from the following lane flows, in vehicles per hour (vph), as recommended by the City of San Jose Design Code:

- 750 vph for collector streets
- 1,600 vph for arterial streets
- 1,900 vph for expressways (no expressways would be closed at any time)

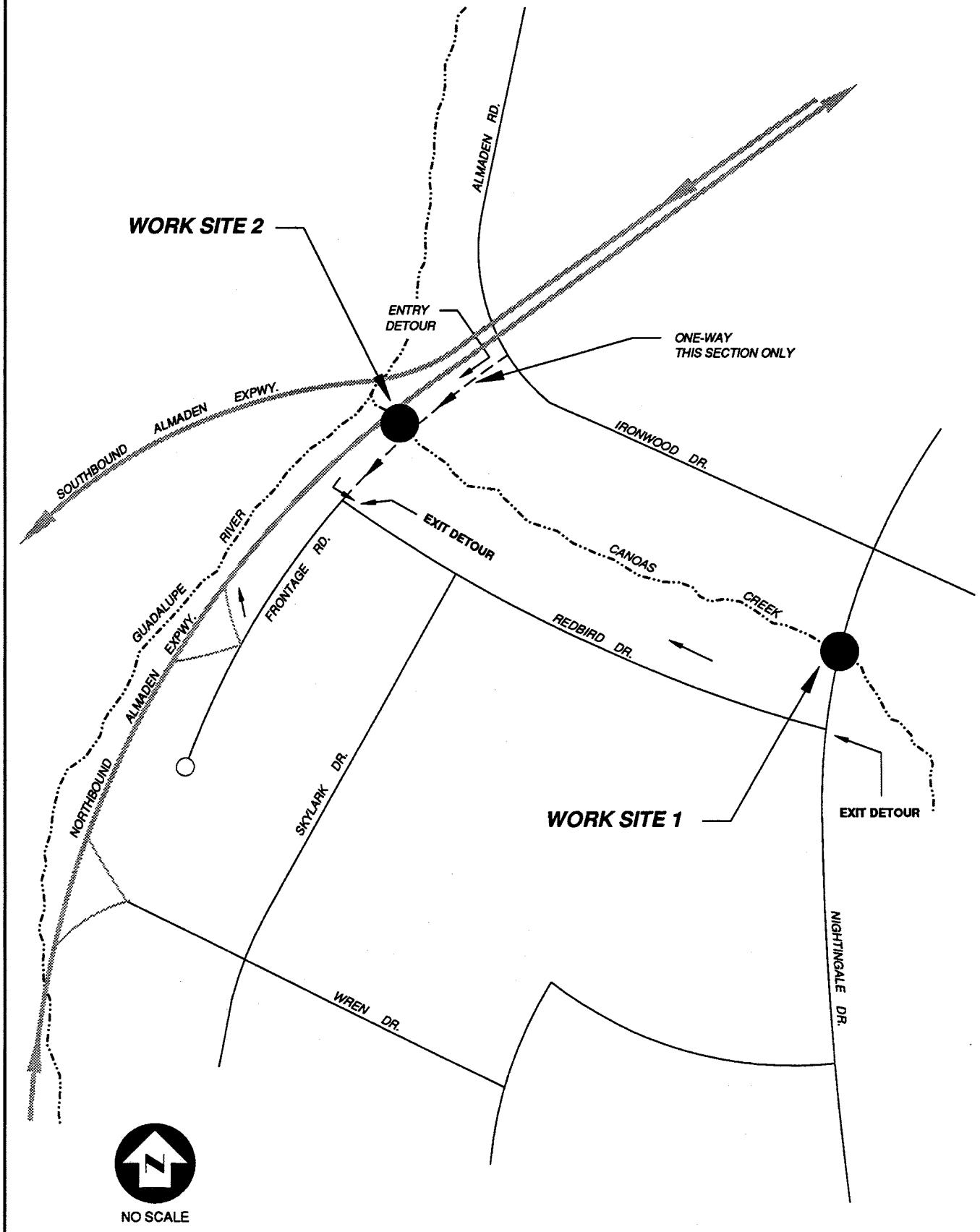
Although these capacity values are general and would in actuality depend upon the peak-hour operation of the adjacent signalized intersections, they should be adequate for planning purposes.

The quantitative traffic impact of bridge closings can be developed from Table 4.7-4. The peak traffic volumes of bridges that would be closed are added to the traffic volumes of neighboring bridges that would remain open. The District does not plan to close all the bridges at the same time. It is recommended that no two adjacent bridges be closed simultaneously.

West Alma Avenue could theoretically accept all 600 peak-hour peak-direction vehicles from both Virginia and Willow Streets to the north. Due to the important function of the four-lane West Alma Avenue, it would be advisable to maintain at least two lanes open at all times on West Alma Avenue. Constricting the present West Alma Avenue traffic to one lane westbound and one lane eastbound would have some impact, but it should be much less than if the entire street were closed. Traffic diversion through the residential neighborhoods that line the Guadalupe River would result from complete closure. The temporary closure of Willow Glen Way could be absorbed by Malone Road to the south and West Alma Avenue to the north, with minimal impact, assuming two lanes on West Alma Avenue remain open.

The bridge on Curtner Avenue, being the highest-volume street that is proposed for temporary closure, is the key bridge. As such, the District has phased the bridge replacement so that two lanes (one in each direction) can be kept open at all times. Night time closure for detour changeovers could be accommodated. Because of the sensitive nature of the neighborhood to the north and the Koch Lane residential area to the south of the Malone Road bridge, partial capacity would be maintained on Curtner Avenue.

Figure 4.7-3 depicts the traffic detours caused by Canoas Creek construction south of Curtner Avenue. The full closure of Nightingale Drive at "Work Site 1" would divert traffic as shown. Southbound trips would divert southbound along the existing one-way frontage road



CANOAS CREEK CONSTRUCTION

paralleling Almaden Expressway to Redbird Drive. Northbound trips would approach the intersection of Almaden Road/Ironwood Drive and Almaden Expressway via Redbird Drive and a different segment of the frontage road. The need to use this frontage road requires that the two Canoas Creek box culvert projects be scheduled during separate time periods. Figure 4.7-3 shows the two project locations as "Work Site 1" and "Work Site 2."

Impact T-2: Traffic on Almaden Expressway Would be Affected During Construction. The project includes two crossings affecting Almaden Expressway, at Canoas Creek and at Ross Creek (Figure 4.7-2). As shown in Table 4.7-4, peak-hour northbound and southbound Almaden Expressway have some excess volume capacity. The only acceptable alternate route for diverted traffic would be the SR 87 Freeway. Therefore, it would be inadvisable to remove any lanes from the Expressway, even temporarily. Removal of one lane in each direction would reduce capacity below the demand. Construction should be staged so as to maintain three lanes in each direction. Otherwise, congestion could result, with vehicles using local streets in peak hours, attempting to bypass the construction bottleneck.

Impact T-3: During Construction, Transit Lines Would be Rerouted, Which Would Affect Scheduling. Santa Clara County Transit bus lines that use any of the project bridges would need to be temporarily rerouted and rescheduled during bridge closures. Detouring the bus lines would cause more vehicle-miles of travel on the affected routes, and could change their times sufficiently to require the printing and dissemination of new schedules and the possible addition of more transit vehicles and operators.

Impact T-4: Pedestrian and Bicycle Use Would be Temporarily Affected by Bridge Construction. Before any bridges or culvert crossings are closed, the impact upon school children should be considered. Although the Guadalupe River is not a school district boundary, some students must cross the river on bridges that would be affected by the project. In each of these cases, a pedestrian bridge should be constructed and maintained to minimize pedestrian impact. Pedestrian access to the Virginia and Tamien light rail transit stations could be disrupted by closure of the Virginia Street and West Alma Avenue bridges.

Impact T-5: Truck Traffic Would Increase During Construction. Excavation of bypass channels and widening of the existing creek channel in places would necessitate the movement of haul trucks in and out of the area. Construction of bridges, box culverts, and flood walls would require ready-mix concrete trucks and steel-carrying trucks which could disrupt residential areas. As indicated in the District's General Construction Procedures, Appendix B, construction activities would be limited to the hours of 8 AM to 5 PM.

Impact T-6: SPRR and UPRR Operations Could be Affected by Installation of Reinforced Concrete Box Culverts in Reach 7. The project includes construction of reinforced concrete box culverts under SPRR and UPRR tracks in Reach 7. Typically, the box culverts would be constructed on site and later jacked under the railroads by pushing or pulling on either side of the crossings. If the Southern Pacific and Union Pacific Transportation Companies were to allow track closure for temporary bridge installation, then the jacking method would not be used. Installation of a temporary bridge would involve raising the track profile, driving piles, removing both existing tracks, installing shoring, and placing structural steel beams and diaphragms. Following temporary bridge construction,

tracks would be reinstalled, including rails, ties, and ballast. Jacking method would have no significant traffic impacts. The temporary bridge installation method would affect the railway schedule.

Operational Impacts

The project would include reduction in local residential populations and minor roadway modifications. After construction, no adverse traffic impacts would remain.

Mitigation Measures

Mitigation Measure T-1: Establish Traffic Detours to Minimize the Disruption of Traffic Caused by Construction. Construction of the Curtner Avenue bridge would be phased to maintain a minimum of one lane open to traffic at all times in each direction. The remainder of the traffic would be diverted to Malone Road. The Hillsdale Avenue bridge would be removed only after Pearl Avenue is in place and the Pearl Avenue bridge is constructed.

Construction of the Virginia bridge would divert traffic to Willow Street and West Alma Avenue. Construction of the Willow bridge would start only when Virginia Street is open for traffic. For the Alma Avenue bridge, phased construction would maintain a minimum of two lanes open to traffic at all times in each direction. Willow Glen Way would be temporarily closed and traffic would be detoured to Alma Avenue and Malone Road during construction of the Willow Glen Way bridge. No two adjacent bridges should be closed at the same time.

The Nightingale Drive box culvert construction should not occur simultaneously with the nearby Almaden Expressway work. Almaden Expressway construction at Canoas Creek and at Ross Creek should be planned to provide three lanes open in the peak traffic direction during peak hours. Also, one or more of the following measures for the vicinity of Almaden Expressway should be considered:

- Schedule the construction during summer months when traffic is lighter
- Schedule the two Canoas Creek box culvert projects during separate time periods
- Install the culverts by boring and jacking
- Use precast box sections for culvert construction

To further mitigate the traffic impacts of construction detours, traffic management techniques such as the use of barricades and warning signs shall be applied. These methods are described in the Caltrans *Traffic Manual* or *Manual of Traffic Controls for Construction and Maintenance Work Zones* (California Department of Transportation, 1996). Another source of these techniques is Part VI of the *Manual of Uniform Traffic Control Devices for Streets and Highways* (U.S. Department of Transportation, Federal Highway Administration, Revision September 3, 1993). Residents and businesses in impacted areas would be notified regarding alternate traffic and pedestrian routes.

Mitigation Measure T-2: Minimize Disruption to Almaden Expressway by Specific Construction Scheduling Procedures. Work on Almaden Expressway should minimize interference with either the northbound AM peak-hour or the southbound PM peak-hour weekday commute traffic. To maintain three lanes in each direction, construction at Canoas Creek (Work Site 2, Figure 4.7-3) would occur in two stages. First, the three northbound lanes of Almaden Expressway would be relocated to the existing right-turn lane and a frontage road. This would necessitate temporary closure of the turn lane and frontage road, during which time the west half of the new culvert would be built. Then the expressway lanes would be moved back to allow construction of the remainder of the culvert, after which the turn lane and frontage road could reopen.

At Ross Creek, construction of temporary "shoofly" roadways could allow maintaining all six lanes of Almaden Expressway, with a three-stage construction schedule. First, utilizing the median and westerly shoulder, the northbound and southbound roadways would both be relocated westerly to allow construction of the eastern one-third of the proposed box culvert for Ross Creek. Second, the northbound lanes would be moved easterly to allow the center one-third of the culvert to be built. Third, using the median, the southbound lanes would be moved easterly to allow the final one-third of the culvert to be installed. Upon completion all the lanes would be relocated to their present position.

Mitigation Measure T-3: Notify County Transit of Bridge Closures and Need for Rerouting. The District should notify the SCTVA of bridge closures so that bus lines can be rerouted and disruption to scheduling can be minimized.

Mitigation Measure T-4: Establish Temporary Alternative Pedestrian and Bicycle Access. When a bridge is closed to vehicular traffic, pedestrian bridge access should be provided so that access to schools and light rail transit stations is not blocked. When the Virginia Street and West Alma Avenue bridges are closed to vehicular traffic, temporary pedestrian facilities should be provided so that pedestrian access to and from the Virginia and Tamien light rail transit stations is maintained. Any pedestrian bridge should also be designed to accommodate bicycles.

The existing walkway along the Almaden Expressway frontage road between Ironwood and Redbird Drives should be maintained at all times. During complete closure of the Nightingale Drive/Canoas Creek crossing, pedestrians could use the frontage road walkway. Placement of adjacent concrete barriers (K rail) would protect pedestrians from high-volume high-speed expressway traffic.

Mitigation Measure T-5: Minimize Traffic Disruption That Contractor Vehicles and Haul Trucks Could Cause During Construction by Establishing Haul Routes and Other Measures. Project contract documents and specifications should include some restrictions on truck traffic. Truck travel on residential streets other than those where the actual project is located, such as Nightingale Drive, should be prohibited. The construction manager should monitor the movements of contractor vehicles to insure that trucks use the designated routes (no cutting through residential areas). Work on or near residential streets, such as McLellan Avenue, would be limited by time of day to prevent night time disruption to nearby residents (see Appendix B).

Mitigation Measure T-6: The District's Contractor Should Comply With all Railroad Company Regulations and Instructions Governing Railroad Operations and Property. The District's contractor should comply with railroad company rules, regulations, and instructions governing the use of signals and flags for all railroad property, including directing train traffic, as a protection against accidents. The contractor should also comply with rules governing the protection of tracks and the traffic moving on such tracks, wires, and signals at or in the vicinity of the construction area. To avoid railway schedule delays or interruptions, the construction of the box culverts that require track removal and replacement should be scheduled on weekends or at other times as designated by the railroad.

The contractor should conduct his operation adjacent to the railroad facilities and within the railroad right-of-way, in such a manner as to maintain structures and other facilities in good and safe conditions. When constructing the box culverts under the temporary bridge, the contractor should follow all applicable regulations and would exercise extreme caution.

Residual Impacts After Mitigation

Construction related traffic impacts can be mitigated to a level of insignificance by proper construction staging and detours and appropriate routing of construction traffic. There would be no adverse operational impacts on traffic.

Minimize Vegetation Impacts Alternative

In Reaches A, 6, 7, 8, 10B, 11B, and 11C, construction impacts would be similar to the Preferred Project. Mitigation measures recommended for the Preferred Project should be incorporated into the MVI Alternative to reduce potential traffic impacts in Reach A and Reaches 6 through 8.

In Reaches 9 and 10A, a bypass channel would be constructed adjacent to the east side of Creek Drive from Willow Glen Way to Malone Road and adjacent to the east side of El Rio Drive from Curtner Avenue to Canoas Creek. Under this alternative, 65 structures would be removed in Reach 9 and 18 structures would be removed in Reach 10A with a subsequent reduction of approximately 830 daily vehicle trips and approximately 66 PM peak-hour trips from the surrounding residential streets. This would be a beneficial project impact.

In Reach 11, an earth bypass channel would be constructed east of the natural channel from Capitol Expressway to Bryan Avenue. This construction would necessitate the removal of 32 structures. The daily vehicle trips in this area would subsequently be reduced by 320 trips with a PM peak-hour reduction of approximately 26 trips. This would be a beneficial project impact.

The MVI Alternative would be associated with construction traffic impacts related to bridge construction, similar to those identified in Impact T-1 for the Preferred Project. Following the same methodology discussed under the Preferred Project Alternative, reserve capacities at the bridges were determined and evaluated for sufficiency to accommodate diverted traffic. There is sufficient capacity on Malone Road to accommodate diverted traffic from Willow Glen Way and sufficient capacity on Willow Glen Way to accommodate diverted traffic from

Malone Road. It is recommended that construction be staged so both bridges are not closed at the same time.

No Project Alternative

There would be no long-term, operational traffic impacts for this alternative; therefore, no mitigation would be necessary. However, under the No Project Alternative flooding would continue to affect the project area resulting in future inundation, closure, and damage to roads, bridges, and freeways. These temporary roadway and traffic impacts would continue under the No Project Alternative.

4.8 NOISE

Introduction

Noise is most often defined as unwanted sound. Sound levels can be easily measured, but the variability in subjective and physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "loudness" or "noisiness." Physically, sound pressure magnitude is measured and quantified in terms of a level scale in units of decibels (dB). All sound pressure levels discussed in this study are referenced to the standard reference quantity of 20 micropascals.

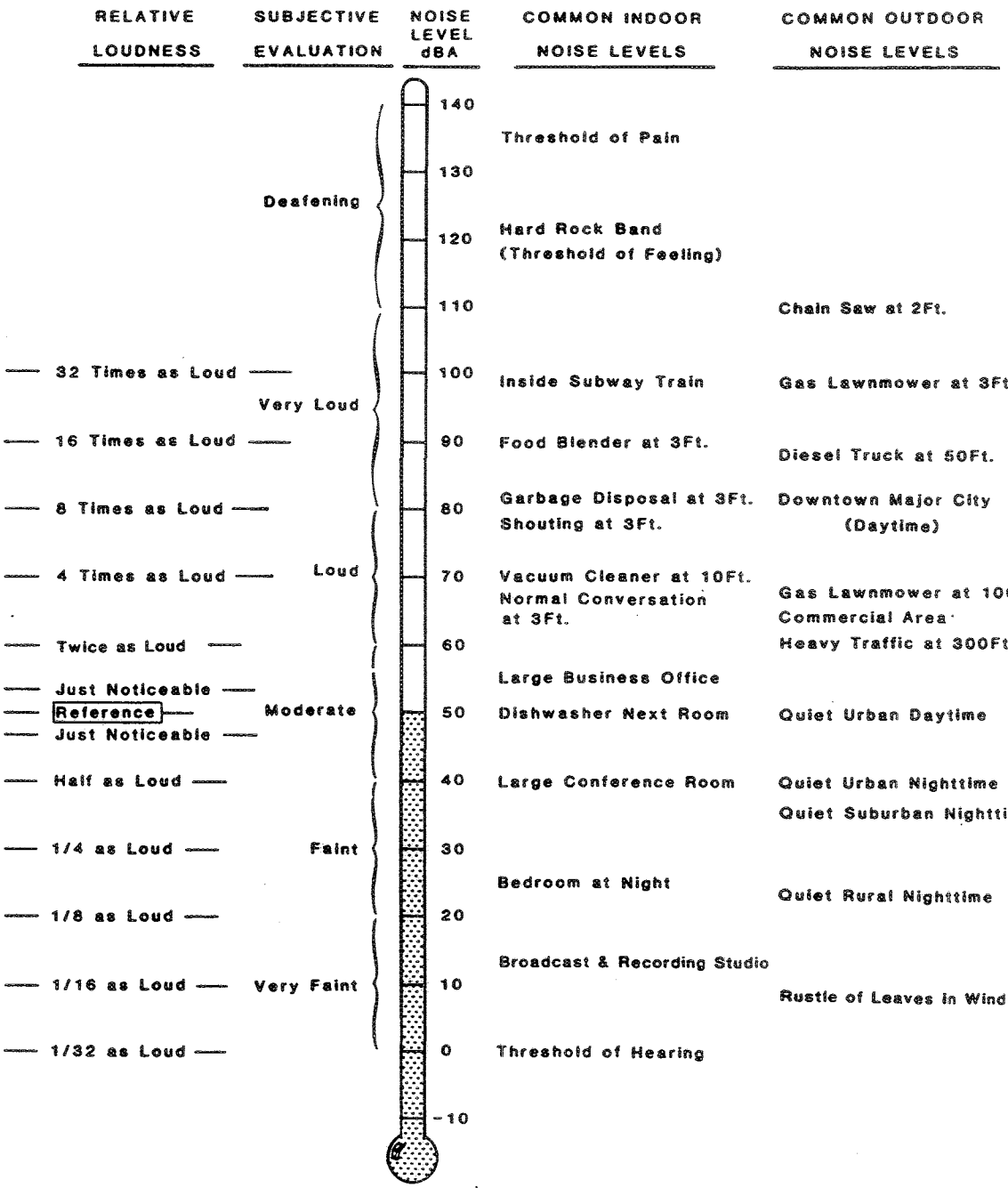
The human hearing system is not equally sensitive to sound at all frequencies. Because of this variability, a frequency-dependent adjustment called A-weighting has been devised so that sound may be measured in a manner similar to the way the human hearing system responds. The use of the A-weighted sound level is often indicated by using the abbreviation "dBA" for expressing the units of the sound level quantities. An increase in the noise level of 10 dBA is judged by most people to be a doubling in loudness, whereas most people are unable to detect a change in level of 3 dBA or less. Typical A-weighted noise levels measured for various sources are provided in Figure 4.8-1.

In a typical outdoor environment, the noise level varies over time according to various activities in the community (e.g., automobile pass-by on a nearby street, aircraft overflight, dog barking). Because of the time-varying noise level in a community, it is difficult to describe the noise environment without referencing a specific point in time (i.e., "the noise level was 57 dBA at exactly 6:52:00 PM and varied every second before and after that time"). It is desirable to describe a noise environment with a single number representing an hour or even a whole day so that easy reference and comparisons can be made. A common method which is widely used in the United States and abroad considers the average noise level recorded over a period of time and is referred to as the equivalent level or L_{eq}. L_{eq} is a single-number noise descriptor that represents the average sound level in an environment where the actual noise level varies with time.

Several methods have been devised to relate noise exposure over time to community response. The Environmental Protection Agency (EPA) has developed the Day-Night Average sound level (L_{dn}) as the rating method to describe long-term annoyance from environmental noise. L_{dn} is similar to a 24-hour L_{eq} A-weighted, but with a 10 dB penalty for nighttime (10 PM to 7 AM) sound levels to account for the increased annoyance that is generally felt during normal sleep hours. The Air Force, U. S. Environmental Protection Agency and U. S. Department of Housing and Urban Development also use L_{dn} for evaluating community noise impact.

The Community Noise Equivalent Level (CNEL) has been adopted by the State of California for environmental noise monitoring purposes. CNEL is similar to the L_{dn} but includes a penalty of 5 dB during evening hours (7 PM to 10 PM), while nighttime hours (10 PM to 7 AM) are penalized by 10 dB.

TYPICAL A-WEIGHTED SOUND PRESSURE LEVELS



RE: 20 Micropascals

For outdoor noise, the L_{dn} noise descriptor is usually 0.5 to 1 dB less than CNEL in a given environment. Noise levels generated by and propagated from a noise source are often shown on maps by contour lines of equal noise level around the source. These lines are referred to as noise contours.

Affected Environment/Setting

The existing noise environment of communities along the Guadalupe River is affected by a number of noise sources, most of which are transportation-related (i.e., aircraft, railway, and roadway). To describe the existing noise environment, noise data were obtained from available studies around the project region and field measurements were conducted to record sound levels.

A 1994 noise contour map was obtained from the City of San Jose International Airport noise office, which indicates the 65 CNEL contours for the airport operations for the third quarter ending 30 September 1993 (see Figure 4.8-2). As shown in Figure 4.8-2, areas of the project most affected are primarily around Reach A. Although the CNEL 60 contour is not shown on the figure, it is estimated that it would encompass residential properties near the Guadalupe River east of the airport, including those along Guadalupe Parkway, Sonora Avenue, Santa Paula Avenue and San Juan Avenue. South of the airport, it is estimated that the CNEL 60 contour would encompass residential properties north of Willow Street along Palm Street, Harliss Avenue and McLellan Avenue. The noise level at these properties would be between CNEL 60 and 65.

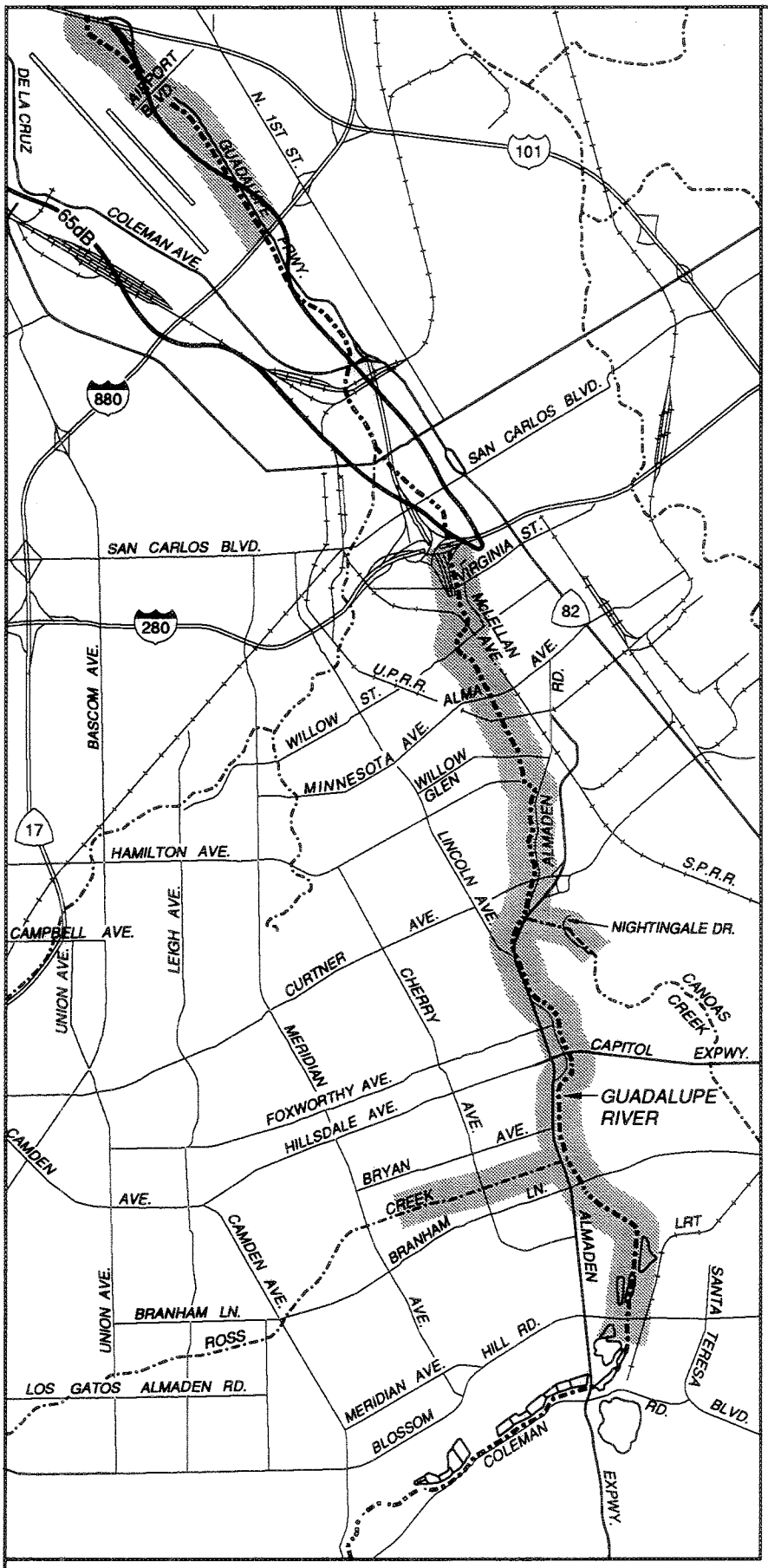
On March 26 and 27, 1990, noise measurements were conducted at various locations along the project area to determine existing background noise levels in the community (refer to Figure 4.8-3 and Table 4.8-1). During the field measurements, it was noted that aircraft overflights influenced the measured levels at all sites over the full extent of the project. Site numbers 6, 7 and 8 (Figure 4.8-3) were substantially influenced by traffic noise on Almaden Expressway. The average background noise measured within the project area is about 59 dBA.

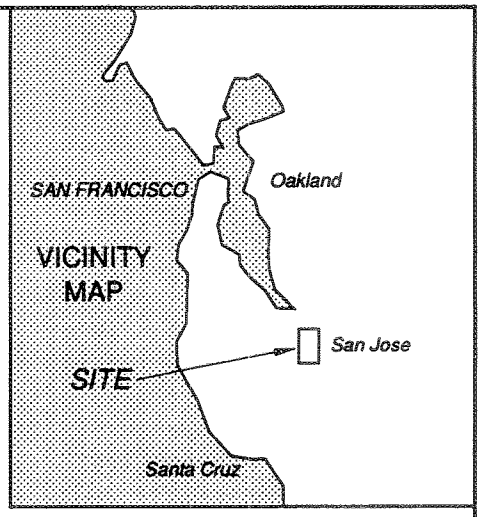
Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

The federal, state and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and various other adverse physiological, psychological, and social effects associated with noise. The City of San Jose has adopted a Noise Element of the General Plan which contains land use/noise compatibility guidelines consistent with state and federal guidelines. The City's guidelines are contained in Figure 4.8-4. The guidelines address four noise level objectives which are to be considered in land use planning. They are: 1) a long-range, exterior noise objective of L_{dn} 55; 2) a short-range, exterior noise objective of L_{dn} 60; 3) an interior noise objective of L_{dn} 45; and 4) a maximum exterior noise level of L_{dn} 76, which should not be exceeded in order to avoid significant adverse health effects. The adverse health effects is based upon,

FIGURE 4.8-2





LEGEND

PROJECT AREA

NOISE CONTOUR (65 dB)

0 3000 6000

SCALE IN FEET

SOURCE: San Jose International Airport

EXISTING AIRPORT NOISE CONTOURS

Guadalupe Flood Control Project

REV.7 C337-03.DWG 12/04/96

ENGINEERING-SCIENCE

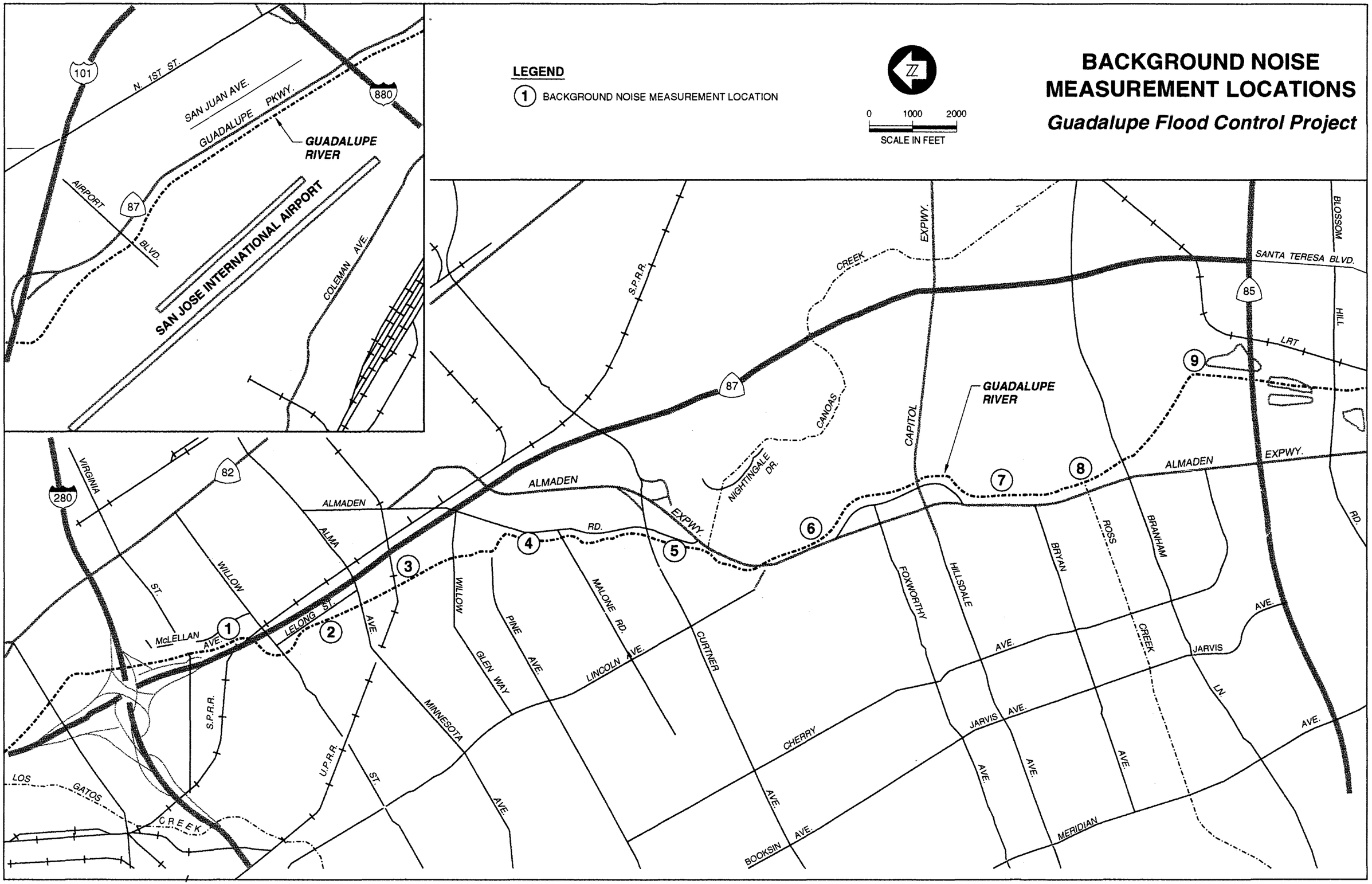
BACKGROUND NOISE MEASUREMENT LOCATIONS

Guadalupe Flood Control Project

LEGEND

(1) BACKGROUND NOISE MEASUREMENT LOCATION

0 1000 2000
SCALE IN FEET



REV.3 C337-02.DWG 04/29/94

ENGINEERING-SCIENCE

TABLE 4-8.1

EXISTING BACKGROUND AMBIENT NOISE LEVELS FROM FIELD MEASUREMENTS ON MARCH 26 & 27, 1990

Location[a]	Date	Time	Hourly Average Sound Level (L_{eq})
Site 1	3/26/90	8:40 am	59 dBA
Site 2	3/26/90	9:10 am	60 dBA
Site 3	3/26/90	9:40 am	56 dBA
Site 4	3/26/90	10:20 am	56 dBA
Site 5	3/26/90	11:00 am	54 dBA
Site 6	3/26/90	3:30 pm	60 dBA
Site 7	3/27/90	8:00 am	67 dBA
Site 8	3/27/90	8:40 am	61 dBA
Site 9	3/27/90	9:10 am	56 dBA

a As shown on Figure 4-8.3.

and would apply only to, long-term operational noise impacts. The L_{dn} 76 criteria does not apply to temporary noise such as construction activities.

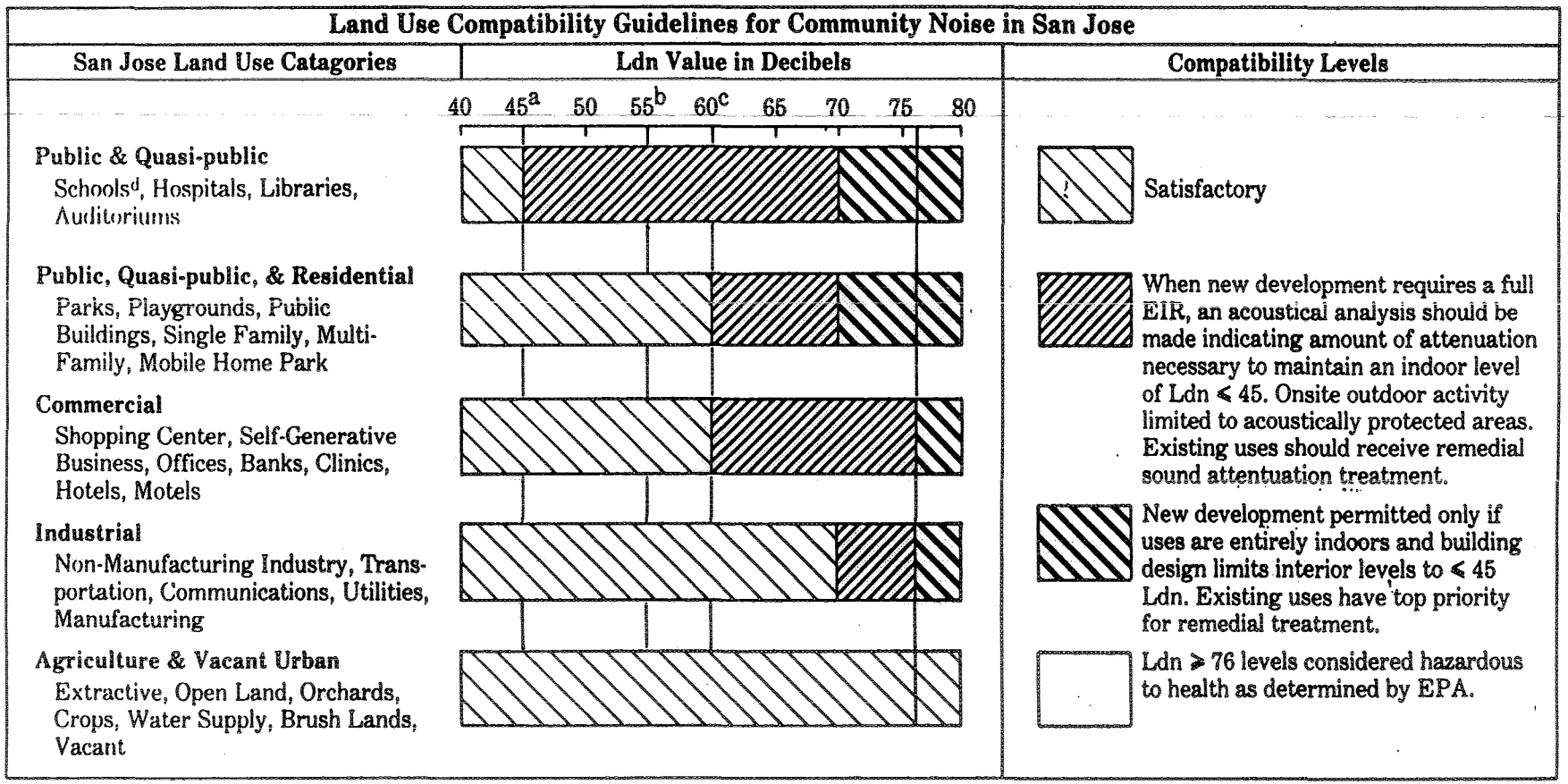
The municipal code in the City of San Jose does not contain a noise control ordinance which is used by some cities to control specific, non-transportation type noise sources such as construction noise, an essential activity within any city. The following is stated as a policy within the City's Noise Element concerning construction noise:

> "Construction operations should use available noise suppression devices and techniques".

For some noise sources such as construction, it is appropriate to equate L_{eq} to L_{dn} when the disturbing noise does not occur during nighttime and evening hours from 7 PM to 7 AM (hence, there is no disturbing noise to penalize with the 10 dBA adjustment during nighttime hours when calculating L_{dn}).[1]

[1] Also, L_{eq} is much more suited to evaluation of construction noise compliance during the mitigation monitoring phase of the project, because use of L_{dn} requires continuous, 24-hour, noise measurements. The average hourly L_{eq} is approximately 2 dBA greater than L_{dn} when no nighttime construction occurs and the average nighttime and evening noise levels are approximately 45 dBA and 50 dBA, respectively. Therefore, an exterior noise criterion of L_{dn} 60 is approximately equal to an L_{eq} of 62 for construction noise in the above conditions.

Land Use Compatibility Guidelines for Community Noise in San Jose



a. Interior Noise Quality Level
b. Long-Range Exterior Noise Quality Level
c. Short-Range Exterior Noise Quality Level
d. L_{eq} value of $L_{eq}(3)$ = is used for the evaluation of school impact by the airport.

Source: Horizon 2000 General Plan, City of San Jose

FIGURE 4.8-4

Normalizing factors should be kept in mind when considering a community's reaction to noise impacts. According to the EPA (EPA 1974), the extent to which a community becomes annoyed with a noise activity will be influenced by the background noise level of the community without the offensive noise. The higher the background noise, the less noticeable becomes the offensive noise. Similarly, the lower the background noise, the more objectionable will the intruding noise be judged by the community. The median background noise at which these variations in the community's attitude begin to occur is around 58 to 62 dBA.

Another important factor, according to the EPA, is the initial attitude of the community toward the operation producing the noise. If the community is aware that the operation causing the noise is very necessary and will not continue indefinitely, the impact will be less objectionable to the community. A summary of these normalizing environmental noise corrections from the EPA study is reproduced in Table 4.8-2. The net effect of background noise and community attitude, according to the EPA, would make construction noise, for example, seem 5 to 15 dBA less than other noise impacts where these factors are not involved.

Consideration should also be given to the duration of continual daily construction operations affecting a community. When the number of continual days of construction activities between breaks is short (less than two weeks, for example), it has been shown that communities will tolerate higher noise levels (CERL 1978). A break in construction activities lasting four or more days would give the community relief from noise impacts. Table 4.8-3 provides the recommended criteria for construction noise based on the findings in the EPA study, the duration of construction activities affecting a particular community and the current noise criteria in the City of San Jose. No duration adjustments are made if construction normally continues for several weeks at a time without breaks.

Preferred Project

Less-Than-Significant Impacts

Noise from traffic on local roads is of particular concern to some residents along the proposed flood control project where construction requires the removal of trees and vegetation which currently provide some noise buffer of nearby, heavily traveled roads. Studies have shown that trees and vegetation provide noise attenuation when they are very thick and densely packed, with mature foliage beginning at ground height.[2] Field reconniassance of the project area indicates that the project would not affect dense vegetation adjacent to housing except where houses are also proposed for removal.

To test the findings of the published studies on vegetation attenuation, an investigation was made at Wellington Square and Harvest Meadow Court where trees and vegetation currently provide some screening of Almaden Expressway. Noise measurements were conducted 10

[2] Typically, 10 dBA of noise reduction can be expected for every 100 feet of depth of this kind of vegetation when at least 10 to 20 feet in height.

CORRECTIONS TO BE ADDED
TO THE MEASURED DAY-NIGHT SOUND LEVEL (L_{dn})
OF INTRUDING NOISE
TO OBTAIN NORMALIZED L_{dn}[D-3]

Type of Correction	Description	Amount of Correction to be Added to Measured L_{dn} in dB
Seasonal Correction	Summer (or year-round operation)	0
	Winter only (or windows always closed)	−5
Correction for Outdoor Noise Level Measured in Absence of Intruding Noise	Quiet suburban or rural community (remote from large cities and from industrial activity and trucking)	+10
	Normal suburban community (not located near industrial activity)	+5
	Urban residential community (not immediately adjacent to heavily traveled roads and industrial areas)	0
	Noisy urban residential community (near relatively busy roads or industrial areas)	−5
	Very noisy urban residential community	−10
Correction for Previous Exposure & Community Attitudes	No prior experience with the intruding noise	+5
	Community has had some previous exposure to intruding noise but little effort is being made to control the noise. This correction may also be applied in a situation where the community has not been exposed to the noise previously, but the people are aware that bona fide efforts are being made to control the noise.	0
	Community has had considerable previous exposure to the intruding noise and the noise maker's relations with the community are good	−5
	Community aware that operation causing noise is very necessary and it will not continue indefinitely. This correction can be applied for an operation of limited duration and under emergency circumstances.	−10
Pure Tone or Impulse	No pure tone or impulsive character	0
	Pure tone or impulsive character present	+5

TABLE 4.8-3

CONSTRUCTION NOISE CRITERIA FOR NOISE SENSITIVE LAND USES[a]
(Shaded Line Is The Average Backbround Noise In The Project Area)

Background Noise Level in Community[b]	Noise Criteria Based on the No. of Days of Activity[c]				
	16+	8-16	4-8	2-4	1-2
53 - 57	57	60	63	66	69
58 - 62	62	65	68	71	74
63 - 67	67	70	73	76	79

a Noise sensitive land uses include residences, schools, hospitals, parks and libraries.

b The background noise level is the daytime average noise level, L_{eq}, dBA, which has been estimated to be approximately equal to the Day-Night Average Level (L_{dn}) with no project construction noise.

c The recommended construction noise criterion is the average noise level (L_{eq}) expressed in dBA and is estimated to be approximately equal to L_{dn} + 2 dBA during project construction if construction is limited to daytime hours only.

feet west of the property wall behind the sparsely scattered trees. The measurements were made at a time when traffic noise on the Expressway was generally higher than the background noise. Traffic volumes and speeds were also monitored using a video camera to ensure that variations would be accounted for between the two measurement periods. The FHWA highway noise prediction computer model, STAMINA, was used to calculate the traffic noise levels at the measurement sites without considering shielding effects of trees. Calculations were made using the same traffic volume and speed that were recorded during noise measurements. The results of computer predictions were between 0.3 to 1 dBA of the actual measured levels behind the trees and vegetation near the residential communities. Research on human sensitivity to noise has shown that any increase in the noise level less than 3 dBA is not noticeable to human hearing. The test showed that the existing trees are not currently providing noticeable noise attenuation, and that Expressway noise would not increase significantly after tree removal.

There are not expected to be any significant noise impacts during normal operation after completion of the project. Activities such as routine and periodic maintenance requiring access within the project right of way are not expected to create noise that would produce adverse reactions within the surrounding communities. Potential impacts from operational noise are insignificant and no mitigation measures are recommended.

Construction Impacts

Impact N-1: Temporary Increased Noise Levels. A noise criterion of 62 dBA, L_{eq}, assuming more than 16 days of construction at any given site, would be exceeded at noise sensitive land uses throughout the extent of the project. The projected impacts exceed the

criterion by as much as 24 dBA in some areas (Table 4.8-4). Construction would cause, within 1,000 feet of the project, noise levels of 63 to 70 dBA, when construction activities are in a clear line-of-sight to the community (refer to Table 4.8-4). This shows that the lower limit of the noise criteria would be temporarily exceeded by 1 to 8 decibels and the upper limit should not be exceeded.

TABLE 4-8.4

OVERALL CONSTRUCTION NOISE LEVELS

	Average Noise Level at Various Distances[a]			
Construction Stage	100 Ft	200 Ft	500 Ft	1,000 Ft
Clearing	80	75	69	63
Excavation	86	81	75	70
Foundation	83	78	72	66
Erection	83	78	72	66
Finishing	83	78	72	66

a The average noise level (L_{eq}) produced during a construction stage is shown at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. Noise levels are expressed in dBA.

Background noise will increase the above noise levels as follows: when the background noise is equal to or within 1 dBA of the construction noise, the overall noise level is 3 dBA higher than those shown above; background within 2-3 dBA, an increase of 2 dBA; within 4-9 dBA, an increase of 1 dBA; and a background 10 dBA or more below will not increase the overall noise level.

Representative sound levels for the most common types of construction equipment and a scenario of equipment usage factors were obtained from published research documents (CERL 1978, EPA 1971). Table 4-8.5 provides the data which were used in the assessment of construction noise during five typical stages of public works construction operations: clearing, excavation, foundation, erection, and finishing. Table 4-8.4 indicates the projected noise levels during the five stages at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. The use of diesel-powered heavy equipment, jackhammers, and gasoline-powered chainsaws would result in relatively high noise levels adjacent to the project site.

Construction noise would temporarily increase noise levels above the background noise in areas around the construction site at different times in all reaches of the project. The following sections describe specific noise sensitive areas where impacts would occur along the project.

TABLE 4-8.5

TYPICAL NOISE DATA FOR CONSTRUCTION EQUIPMENT

Equipment Type	L_{eq} at 50 ft.	Usage Factors in Various Stages[b]				
		Clearing	Excavation	Foundation	Erection	Finishing
Air Compressor	82	—	1.0(2)	0.4	0.4	0.4(2)
Backhoe	85	0.04	0.4	—	—	0.16
Concrete Mixer	85	—	—	0.16(2)	0.4(2)	0.16(2)
Crane, Derrick	88	—	0.1	0.04	0.04	—
Dozer	85	0.04	0.4	—	—	0.16
Generator	78	1.0(2)	0.4(2)	0.4(2)	0.4	0.4(2)
Grader	85	0.08	—	—	0.2	0.08
Jack Hammer	88	—	—	—	0.04	0.1(2)
Loader	82	0.04	0.4	—	—	0.16
Pneumatic Tool	85	—	—	0.04(2)	0.1	0.04
Pump	76	—	0.4(2)	1.0(2)	0.4(2)	—
Saw	78	0.08(2)	—	0.04(2)	—	—
Scrapper	88	0.08	—	0.2	0.08	0.08
Shovel	82	0.04	0.4	0.04	—	0.04
Truck	83	0.16(2)	0.16	0.4(2)	—	0.16(2)

a L_{eq} is the average noise level in dBA.

b Usage factors are used to determine the average noise level (L_{eq}) produced during a construction stage considering all noise sources compositely. The usage factors are based on the percentage of sites where the equipment is present and the duty cycle of the equipment while present. A number in parentheses indicates multiple equipment present. A "--" indicates not present during the stage.

Reach A. The first row of houses on San Juan Avenue would be exposed to construction noise between 71 and 77 dBA, L_{eq}. The second row of houses would be shielded by the first row and noise levels would be approximately 7 to 10 dBA less than at the first row.

The residences south of Route 880 at the north end of Regent Street would experience construction noise impacts between 59 and 65 dBA, L_{eq}. This assumes that the project construction stops at Route 880 and that some noise shielding is provided by the existing elevated freeway.

Traffic or aircraft noise levels are not combined with the construction noise level. During morning and afternoon peak traffic noise hours, or during landing and takeoff of a large aircraft, the traffic or aircraft noise may be more than the construction noise. However, during most of the day, construction noise would be the dominating source.

Reach 6. There are residential areas just south of State Route 280 on the east side of the river at the corner of Grant and Palm streets, at the corner of Virginia Street and Harliss Avenue, and at the south end of McLellan Avenue; and west of the river at the ends of Mills Court and Atlanta Avenue and along the west side of Minnesota Avenue near Willow Street. These homes would experience construction noise impacts between 78 and 84 dBA, L_{eq}. Other noise-sensitive land uses in those communities along Reach 6 would also experience noise impacts but to a lesser degree due to greater distances and partial shielding by structures closer to the river.

Demolition of 54 residences in Reach 6 would generate noise during the use of backhoes, cranes, dozers, and trucks. Noise levels at the property line (assuming about 50 feet from the center of the construction site) would range from 83-88 dBA, L_{eq} (Table 4-8.5). Demolition-related construction would be short-term and intermittent. Based on the proposed property management plan, houses could be demolished at any phase in the project (all would be demolished two years prior to project construction). Therefore, demolition-related noise impacts could be spread over the next 20 years. An individual home can be removed in two to five days.

Reach 7. Residential areas on the west side of the river along the east side of Minnesota Avenue and north of West Alma Avenue would be affected by construction noise levels between 75 and 84 dBA, L_{eq}. The Elks Lodge would experience noise levels between 85 and 91 dBA, L_{eq} while the impact at commercial properties across from the Elks Lodge would be 75 to 81 dBA, L_{eq}. Other noise-sensitive land uses in those communities along Reach 7 would also experience noise impacts but to a lesser degree due to greater distances and partial shielding by structures closer to the river.

Demolition of commercial buildings in Reach 7 would generate about 83 to 88 dBA, L_{eq} during use of backhoes, cranes, dozers, and trucks. Demolition-related construction would be short-term and intermittent and could occur at a given location at any time during the 20 year design/construction phase of the project.

Reach 8. Residential areas on both sides of the river along Mackey Avenue on the east side and along Creek Drive on the west side would experience construction noise levels between 75 and 81 dBA, L_{eq}. Other noise-sensitive land uses in those communities along Reach 8 would also experience noise impacts but to a lesser degree due to greater distances and partial shielding by structures.

Demolition of 23 residences in Reach 8 would generate about 83 to 88 dBA, L_{eq} during use of backhoes, cranes, dozers, and trucks. Demolition-related construction would be short-term and intermittent and could occur at a given location at any time during the 20 year design/construction phase of the project.

Reach 9. Noise sensitive areas adjacent to both sides of the river along Guadalupe Avenue, Creek Drive, Almaden Road, Malone Road, Ardis Drive and Coastland Avenue would experience construction noise impacts between 74 and 86 dBA, L_{eq}. Other noise-sensitive land uses in those communities along Reach 9 would also experience noise impacts but to a lesser degree.

Demolition of six residences and two businesses in Reach 9 would generate about 83 to 88 dBA, L_{eq} during use of backhoes, cranes, dozers, and trucks. Demolition-related construction would be short-term and intermittent and could occur at a given location at any time during the 20 year design/construction phase of the project.

Reach 10. Land uses along this reach are primarily commercial, agricultural and open space uses which would be less sensitive to construction noise impacts. However, adjacent residential areas along El Rio Drive, Roy Court and Skylark Drive would experience construction noise levels between 74 and 86 dBA, L_{eq}. Residential areas along Lincoln Avenue between Delynn Way and Berkshire Drive would experience construction noise impacts between 71 and 79 dBA, L_{eq}. Residential areas along Ironwood Drive would also be exposed to construction noise from the Canoas Creek construction activities. Other noise-sensitive land uses in those communities along Reach 10 would also experience noise impacts but to a lesser degree.

Reach 11. Residential areas adjacent to the project along Wellington Square, Harvest Meadow Court, Royal Acres Court, Golden Acres Court, and Thousand Oaks Court near Branham Lane would experience construction noise impacts between 74 and 86 dBA, L_{eq}. Almaden Road residents between Pembridge Drive and Bryan Avenue, and residents on Briar Glen Drive adjacent to the Expressway would experience construction noise impacts between 71 and 77 dBA, L_{eq}. Houses along Ross Creek between the Guadalupe River and Cherry Avenue would be affected by construction noise from the Ross Creek construction activities. Other noise-sensitive land uses in those communities along Reach 11 would also experience noise impacts but to a lesser degree.

Reach 12. Land uses in this reach are primarily commercial, agricultural and open space which would be less sensitive to construction noise impacts. However, adjacent residential areas along Tonino Drive and the end of Dawnview Court would be affected by construction noise levels between 74 and 88 dBA, L_{eq}. Other noise-sensitive land uses in those communities along Reach 12 would also experience noise impacts but to a lesser degree.

Mitigation Measures

Mitigation Measure N-1: Equip Construction Equipment With Standard Noise Control Devices and Implement Other Noise Control Measures as Necessary to Comply with the Local Plans or Development Permit Requirements. Equipment types that meet Santa Clara Valley Water District noise standards of 83 dBA at 25 feet and 77 dBA at 50 feet should be used. Contractors would be permitted to use equipment which is capable of exceeding the noise levels of 83 dBA at 25 feet, provided that such equipment is operated in such a manner as not to exceed the limits. The overall construction impacts to the community would be lowered by 3 to 7 dBA by implementation of this mitigation measure. The estimated noise levels at various distances from the approximate center of construction activities, assuming standard noise control devices are used on construction equipment are shown in Table 4.8-6, and can be compared with noise levels without the mitigation measure (Table 4.8-4).

TABLE 4.8-6

REVISED CONSTRUCTION NOISE LEVELS WITH RECOMMENDED NOISE LIMITS

Construction Stage	Average Noise Level at Various Distances[a]			
	100 Ft	200 Ft	500 Ft	1000 Ft
Clearing	77	72	66	60
Excavation	79	74	68	63
Foundation	79	74	68	62
Erection	77	72	66	60
Finishing	77	72	66	60

a The average noise level (L_{eq}) produced during a construction stage is shown at various distances (with an unobstructed, clear line-of-sight) from the approximate center of construction activities. Noise levels are expressed in dBA.

Background noise will increase the above noise levels as follows: when the background noise is equal to or within 1 dBA of the construction noise the overall noise level is 3 dBA higher than those shown above; background within 2-3 dBA, an increase of 2 dBA; within 4-9 dBA, an increase of 1 dBA; and a background 10 dBA or more below will not increase the overall noise level.

The noise impact assessment (Table 4.8-6) assumes that the following noise mitigation measures would be incorporated in specifications for District projects and would be, in effect, minimum conditions to be implemented before any other noise control measures are considered.

- All construction equipment operated at the project site shall be equipped with manufacturer's standard noise control devices (i.e., mufflers, lagging, and/or engine enclosures) which will normally achieve compliance with the noise limits.
- No individual piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 feet.
- In no instance shall the noise level at any point outside of the property line or temporary construction area exceed 86 dBA. In residential areas, no construction would occur between the hours of 7:00 PM and 7:00 AM without City approval.

Additional noise mitigation measures would be required to meet the range of noise criteria from 57 to 79 dBA (depending on the existing background noise in the community and the duration of the construction activities). The following noise control measures would help to reduce the noise and achieve compatibility with the surrounding land uses within the project area during construction:

- Temporary plywood barriers could be constructed along the backyards of adjacent residences.
- Pavement breakers could be used in place of jackhammers.
- Pumps for diverting water flows could be enclosed.

All construction equipment should be inspected at periodic intervals to ensure proper maintenance and hence, lower noise levels, as well as compliance with the local general plan noise element policies.

Noisy operations should be avoided when possible when construction progresses within 500 feet of noise-sensitive land uses. The distance between noisy construction related activities and noise-sensitive land uses should be maximized. For example, construction-related truck routes should avoid heavily populated residential streets, if possible. Truck routes should choose industrial or commercial streets or streets with mostly open space along them even though these routes may be longer or indirect. Noisy stationary equipment should be located away from project boundaries which are near noise-sensitive land uses.

The noise analysis assumptions did not include the use of pile driving equipment during any stage of the construction activities. A project of this nature may require piles. Should pile driving be required due to special circumstances, it should be restricted to 85 to 90 dBA at 50 feet, which can by accomplished by vibration/sonic-type pile drivers used with acoustically treated engine enclosures and mufflers. Failure to do so would result in noise levels extremely objectionable to the community regardless of the background noise.

Construction would not be continuous at any location for more than seven days.

Implementation of the above mitigation measures is expected to provide sufficient noise reduction to achieve compliance with the criteria listed in Table 4.8-3. The need for temporary noise barriers would be determined on an individual basis by location and would depend on the existing background noise and the expected duration of construction activities. It is anticipated that noise barriers may be necessary in all areas where the construction activities would be within 200 feet of noise sensitive land uses (public, quasi-public, and residential uses identified in Figure 4.8-4), and construction is expected to continue for more than two weeks between breaks of four or more days. This is expected to include some of the residential areas in every reach.

Residual Impacts After Mitigation

With implementation of the recommended mitigation measures, expected residual impacts from construction noise or operational noise would be less than significant according to the criteria discussed above.

Minimize Vegetation Impacts Alternative

Noise impacts of the Minimize Vegetation Impacts Alternative are similar to the Preferred Project. There would be no long-term operational impacts, and cumulative impacts would be

the same. Similar mitigation measures would apply to the Environmentally Sensitive Project. However, some differences in the construction requirements would result in a change in construction noise impacts.

An earth bypass channel would be constructed near the existing channel in Reaches 9, 10A, and 11, resulting in noise impacts for a longer period in these reaches. Construction of the channel would require demolition of houses and removal of roads.

Large-scale clearing and grading would result in increased noise generation in Reaches 9, 10A, and 11. However, these differences are not expected to produce unmitigable impacts.

No Project Alternative

Environmental Impacts and Mitigation Measures

Periodic and routine maintenance is not expected to produce significant noise impacts. Therefore, if the project were not constructed, no adverse noise impacts would be produced. Construction noise impacts would not be a factor in the No Project Alternative.

4.9 AIR QUALITY

Affected Environment/Setting

Climatic Setting

The climate of the San Francisco Bay Area air basin is characterized by warm, dry summers and mild, wet winters. Meteorological data for the project area are collected at the San Jose International Airport station. Summer temperatures range from nighttime lows of around 56°F to daytime highs of 81°F. Winter temperatures range from an average daily minimum of 43°F to an average daily maximum of 61°F (NOAA 1982). Precipitation in the area is highly seasonal with 90 percent of the annual precipitation occurring from November through April. Average annual rainfall is approximately 14 inches (NOAA 1982).

Winds in the vicinity of the project area are predominantly northwesterly on an annual basis (Table 4.9-1). The spring months are the windiest with calmer conditions during the winter (CARB 1984). A seasonal wind data summary is presented in Table 4.9-2.

Existing Air Quality

The project area is located within the Bay Area Air Quality Management District (BAAQMD). The area is currently designated by the United States Environmental Protection Agency (EPA) as a non-attainment area for carbon monoxide. No BAAQMD monitoring station has recorded an exceedence of the national 8-hour average carbon monoxide standard since 1991. The BAAQMD has applied for re-designation to attainment status for carbon monoxide. A decision is expected either in 1996 or 1997. In June 1995, the Bay Area was re-designated to attainment for the national ozone standard. The California Air Resources Board (CARB) has established State ambient air quality standards, many of which are more stringent than the corresponding federal standards. The project area has been designated as a non-attainment area on the State level for ozone and inhalable particulates (PM_{10}).

Data compiled by the CARB were examined to estimate the air quality in the vicinity of the project area. The BAAQMD operates a monitoring station in San Jose located on 4th Street. A summary of 1992-1994 ambient air quality data from this station, along with applicable state and federal ambient air quality standards, is presented in Table 4.9-3.

All monitored values for nitrogen dioxide and lead are below the applicable state and federal standards. Ozone levels exceeded the California standard in all three years, but did not exceed the federal standards. The 8-hour carbon monoxide standard has not been exceeded since 1991. The 24-hour California PM_{10} standard was violated many times in all three years. Carbon monoxide and total suspended particulate levels have fluctuated over the past ten years, but overall appear to be on a downward trend. Recent data (CARB 1985-1994), presented in Table 4.9-4, show that San Jose levels of ozone and nitrogen dioxide have gradually decreased over the last decade. Lead levels have been significantly reduced over the last eight years. These trends are consistent with the BAAQMD new source review rules and the continuing reduction in vehicle emissions for newer model cars.

TABLE 4.9-1

SURFACE WIND SUMMARY
MEASURED AT SAN JOSE INTERNATIONAL AIRPORT

	Annual	
Direction	% Frequency	Mean Speed (m.p.h.)[a]
N	5.8	6.6
NNE	0.7	5.2
NE	0.8	4.6
ENE	0.9	4.9
E	3.0	6.8
ESE	9.2	8.3
SE	6.5	8.7
SSE	3.7	7.9
S	4.6	8.1
SSW	1.4	7.2
SW	1.2	6.2
WSW	2.6	7.2
W	6.9	8.4
WNW	13.1	9.4
NW	14.6	10.7
NNW	8.2	9.0
CALM	16.7	--
Annual Mean		7.2

Source: California Air Resources Board, California Surface Wind Climatology, June 1984.

a Miles per hour

TABLE 4.9-2

PREDOMINANT WINDS
MEASURED AT SAN JOSE INTERNATIONAL AIRPORT

	Winter	Spring	Summer	Fall	Annual
Direction	ESE	WNW	NW	NW	NW
Speed (m.p.h.)[a]	8.4	10.6	10.0	9.3	9.8
Seasonal % Frequency	27.2	35.6	53.8	32.7	35.9

Source: California Air Resources Board, California Surface Wind Climatology, June 1984.

a Miles per hour

TABLE 4.9-3

NUMBER OF DAYS MOST STRINGENT AMBIENT AIR QUALITY STANDARDS WERE EXCEEDED AND 1992-1994 MAXIMUM CONCENTRATIONS
at San Jose 4th Street Station

Pollutant	Averaging Time	Air Quality Standards		1992		1993		1994	
		State	Federal	Days	Maximum Concentration	Days	Maximum Concentration	Days	Maximum Concentration
Ozone	1-hour	0.09 ppm	0.12 ppm	3	0.12	3	0.11	2	0.11
Carbon Monoxide	1-hour	20 ppm	35 ppm	0	11.0	0	14.0	0	12.0
	8-hour	9 ppm	9 ppm	0	7.8	0	6.9	0	8.9
Nitrogen Dioxide	1-hour	0.25 ppm	—	0	0.10	0	0.12	0	0.11
	Annual	—	0.053 ppm	0	0.027	0	0.027	0	0.028
PM_{10}	24-hour	50 $\mu g/m^3$	150 $\mu g/m^3$	8	106	8	92	7	93
	Annual[a]	30 $\mu g/m^3$	—	NA	31.7[c]	NA	28.1[c]	NA	26.6[c]
	Annual[b]	—	50 $\mu g/m^3$	NA	36.3[c]	NA	33.5[c]	NA	30.9[c]
Lead	Quarter	—	1.5 $\mu g/m^3$	NA	0.03	NA	0.03	NA	0.02
	30-day avg.	1.5 $\mu g/m^3$	—	NA	0.04	NA	0.05	NA	0.02

NA Not applicable due to averaging time measurement

a Annual geometric mean

b Annual arithmetic mean

c Data represented are valid, but incomplete in that an insufficient number of valid data points were collected to meet EPA and/or CARB criteria for representativeness.

Source: California Air Resources Board, California Air Quality Data , 1992-1994.

TABLE 4.9-4

POLLUTANT MAXIMA TRENDS
AT SAN JOSE 4TH STREET STATION

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	State Standard	Federal Standard
1-hour Ozone (ppm)	0.14	0.14	0.14	0.12	0.13	0.12	0.10	0.12	0.11	0.11	0.09	0.12
1-hour Carbon Monoxide (ppm)	20.00	16.00	13.00	15.00	19.00	18.00	15.00	11.00	14.00	12.00	20.00	35.00
1-hour Nitrogen Dioxide (ppm)	0.19	0.16	0.17	0.16	0.15	0.15	0.14*	0.10	0.12	0.11	0.25	—
24-hour PM_{10} ($\mu g/m^3$)	181.00	122.00	112.00	146.00	150.00	165.00	153.00	106.00	92.00	93.00	50.00	150.00
Quarterly Lead ($\mu g/m^3$)	0.38	0.22	0.12	0.14	0.14	0.09	0.04	0.03	0.03	0.02	—	1.50

* Data represented are valid but incomplete, in that an insufficient number of valid data points were collected to meet EPA and/or CARB criteria for representativeness.

Source: California Air Resources Board, California Air Quality Data, 1985-1994.

The BAAQMD is responsible for regulating air pollutant emissions in the project area. As a result, all phases of the project would be required to comply with all of the applicable rules and regulations of the BAAQMD.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Project air quality impacts can be separated into two categories: short-term impacts due to construction and long-term impacts due to project operations. Impacts in each category can be classified as having effects on either a regional or local scale. According to CEQA, a project would have a significant effect if criteria air pollutant emissions would cause the exceedance of ambient air quality standards, contribute to an existing or projected air quality exceedance, or expose sensitive receptors to substantial pollutant concentrations. Additionally, the Bay Area Air Quality Management District (BAAQMD) has developed thresholds of significance for regional emissions increases. The BAAQMD considers increases in regional emissions of 80 pounds per day for reactive organic gases, nitrogen oxides, and particulates (PM_{10}), 150 pounds per day for sulfur oxides, and 550 pounds per day for carbon monoxide to represent a significant adverse impact (BAAQMD 1996).

For the purposes of this EIR/EIS, impacts that cause exceedance of the Federal primary or secondary ambient air quality standards, the California ambient standards, or the BAAQMD thresholds of significance are considered significant adverse impacts.

Preferred Project

Construction Impacts

Impact A-1: Dust and Exhaust Emissions. Air quality impacts would result primarily from fugitive dust produced during excavation, earth moving activities, demolition and site clearing, and exhaust emissions from heavy construction equipment. Long-term air quality impacts are not anticipated.

Fugitive dust from construction would have a temporary impact on local air quality. Dust emissions vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing weather. An approximate emission factor for construction operation is 51 pounds of PM_{10} per acre per day (BAAQMD 1996). Fugitive dust emissions were calculated for each of the stream reaches (Table 4.9-5). The BAAQMD places a level of significance for PM_{10} at 80 lbs/day. Comparing the calculated emissions to this level of significance indicates that a significant level of dust emissions would occur only during Reach 6 construction.

During demolition activities, there is the potential for the dust generated to contain asbestos. Construction contractors would be required to follow the Bay Area Air Quality Management District Regulation 11, Rule 2, which covers asbestos demolition, renovation, and manufacturing. Measures specified in this rule would keep asbestos dust to a level of insignificance. A more detailed discussion of the Rule's requirement is presented in Section 4.4.

TABLE 4.9-5

FUGITIVE DUST EMISSIONS
(lbs/day)

Reach	Fugitive Dust Emissions[a]
A	59
6	82
7	17
8	12
9-10A	43
10B-10C	40
11	49
12	49

a BAAQMD Significance Threshold: 80 lb/day

Exhaust emissions from construction equipment would contribute to local carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides and particulate levels. Because information on construction equipment usages for the project are not available at this time, the emission rates used were based on the estimate that 0.27 gallons of diesel fuel is burned per cubic yard of earth excavated. The pollutant emission rates are presented in Table 4.9-6 (BAAQMD 1996). Daily emissions were calculated using the BAAQMD emission factors and the number of cubic yards of earth excavated for each stream reach. These values were compared with BAAQMD levels of significance (BAAQMD 1996). As shown in Table 4.9-7, construction equipment emissions for the most part would be relatively small and thus would not be significant on the regional scale. However, Reach 12 would exceed the significance level for nitrogen oxides.

There would also be some additional pollutant emissions from transport of materials to and from the construction sites, and due to possible traffic congestion or redistribution in the vicinity of the construction areas. These emissions have not been quantitatively evaluated, but are judged to be small compared to the emissions from construction previously estimated and found to be insignificant.

Mitigation Measures

Mitigation Measure A-1: Control Emissions During Construction. In accordance with the District's standard construction specifications, emissions should be controlled to meet

TABLE 4.9-6

DIESEL CONSTRUCTION EQUIPMENT EMISSION RATES[a]
(g/yd^3)

Pollutant	Emission Rate
Carbon Monoxide	138.0
Reactive Organic Gases	9.2
Nitrogen Oxides	42.4
Sulfur Oxides	4.6
Particulate Matter	2.2

a BAAQMD, 1996

TABLE 4.9-7

EMISSIONS FROM CONSTRUCTION EQUIPMENT
(lbs/day)

	Reach								
Pollutant	A	6	7	8	9-10A	10B-10C	11	12	Level of Significance[a]
Carbon Monoxide	33	237	175	117	140	139	127	343	550
Reactive Organic Gases	2	16	12	8	9	9	8	23	80
Nitrogen Oxides	10	73	54	36	43	43	39	105	80
Sulfur Oxides	1	8	6	4	5	5	4	11	150
Particulate Matter	1	4	3	2	2	2	2	5	80

a BAAQMD, 1996

Bay Area Air Quality Management District regulations. These regulations require that exposed soils surfaces be watered in sufficient quantities to prevent dust raised from leaving the site. As a minimum, watering should be done in the late morning and after work is completed for the day.

District specifications also require that idling of internal combustion engines should be held to an absolute minimum. Construction equipment should be properly maintained and tuned to minimize exhaust emissions.

Spillage resulting from hauling operations along or across any public or private property should be removed immediately. Trucks transporting soil should be covered.

Residual Impacts After Mitigation

Implementation of the above mitigation measures would decrease emissions by up to 50 percent, thereby reducing any potentially significant construction impacts to a level of insignificance.

Minimize Vegetation Impacts Alternative

The Minimize Vegetation Impacts Alternative is very similar to the Preferred Project. However, more excavation, earth moving, and demolition activities would be required in Reaches 9-12 as a result of bypass channel construction. This increase in construction activity would result in an increase in air emissions.

Implementation of mitigation measures recommended for the Preferred Project would effectively reduce or eliminate air emissions under this alternative. Residual impacts after implementation of mitigation measures would be the same as for the Preferred Project.

No Project Alternative

Under the No Project Alternative, there would be no construction; therefore, no construction-related impacts would occur, and no mitigation measures would be required.

4.10 PUBLIC SERVICES AND UTILITIES

Affected Environment/Setting

Police and Fire

Police service for the project area is provided by the San Jose Police Department. The area served by the Department is divided into districts, many of which are traversed by the Guadalupe River channel. As of 1 July 1996, there were 1,299 sworn personnel positions authorized for the Department. With this personnel, the Department would have 1.5 sworn officers per thousand population. The national average is 2.2 sworn officers per thousand population. For cities the size of San Jose, the national average is 2.9 sworn officers per thousand (Dowdle 1996).

The San Jose Fire Department, which serves a total area of 203 square miles, provides all fire protection services for the area covered by the flood control project. The Department has 30 engine companies, 11 truck companies, one hazardous incident team, one arson investigator, and five battalion chiefs on duty in 30 fire stations. Of this total, nine engine companies, four truck companies, and three battalion chiefs respond to portions of the project area. The standard staffing level for the Department is five personnel for each of nine truck companies, two of which serve portions of the project area, and six personnel for each of two truck companies, both of which serve the downtown area in addition to serving portions of the project area. Staffing consists of five personnel for each of two engine companies, one of which serves portions of the project area and four personnel for each of 27 engine companies, eight of which serve portions of the project area. There are six persons in the Airport Engine Company, four on the Hazardous Incident Team, one arson investigator, and five battalion chiefs on duty each day in the Department. Total personnel on duty each day is 191 (Brooks 1994).

There are nine fire stations within the City that serve portions of the proposed Guadalupe River Flood Control project area. They include the following units and personnel at the following locations:

- Station 1 - 201 North Market Street at St. James Street (consisting of one battalion chief, one engine company with one captain, one fire engineer and two firefighters, and one truck company, with one captain, two fire engineers and three firefighters)
- Station 30 - 454 Auzerais Avenue at Minor Avenue (consisting of one engine company with one captain, one fire engineer, and two firefighters)
- Station 3 - 98 Martha Street at Third Avenue at Third Street (consisting of one engine company with one captain, one fire engineer and two firefighters, and one truck company with one captain, two fire engineers and three firefighters)
- Station 6 - 1386 Cherry Avenue at Minnesota Avenue (consisting of one engine company with one captain, two fire engineers and two firefighters);

- Station 9 - 410 Ross Avenue at Hillsdale Avenue (consisting of one engine company with one captain, one fire engineer and two firefighters, and one truck company with one captain, two fire engineers and two firefighters));
- Station 17 - 1494 Ridgewood Drive at Dent Avenue (consisting of an engine company with one captain, one fire engineer, and two firefighters);
- Station 13 - 4380 Pearl Avenue and Knollfied Way (consisting of one battalion chief, one engine company with one captain, one fire engineer and two firefighters, and one truck company with one captain, two fire engineers and two firefighters);
- Station 22 - 6461 Bose Lane at Dwyer Avenue (consisting of one engine company with one captain, two fire engineers, and one firefighter);
- Station 26 - 528 Tully Road near Senter Road (consisting of one engine company with one captain, one fire engineer, and two firefighters).

The recommended standard emergency travel time for the nearest engine company to a given locale in the City is four minutes. Travel times vary from 1.8 minutes to 6.6 minutes for the first due engine responding to portions of the flood control project area. The fire department responded to an estimated 80 fire alarms in the project area in the 1992-93 fiscal year. Of the almost 48,000 alarms that the San Jose Fire Department responded to throughout the City, about 70 percent were medical emergencies, with fires accounting for about 8 percent of the calls. In the project area, the department estimates that 50 percent of all calls are for grass and brush fires; 25 percent are for medical emergency and rescue calls.

Solid Waste

Solid waste removal service is provided by Waste Management, Inc. Residential service is provided once per week, generally during the hours of 6 AM and noon. Commercial service is provided one to five times per week. Garbage trucks characteristically park alongside parked cars while serving residences. For commercial areas, garbage trucks often park in shopping center parking areas.

City Parks

City-operated parks and open spaces adjacent to the project corridor include River Glen Park along Reach 8, Roy Avenue Mini Park beside Reach 9, Canoas Park in Reach 10, the Thousand Oaks Park near Reach 11, and the SCVWD lands surrounding their headquarters beside Reach 12.

Public Utilities

Public utility lines along the flood control project corridor include water, sewer and storm drain lines, telephone and television cables, and gas and electricity lines.

Water mains which serve residences and commercial establishments are located along the entire project route. Water service in the project area is provided by the San Jose Water Company and the City of San Jose Municipal Water System.

Sanitary sewer and storm drain lines are also located along the entire project route. Both systems are operated by the City of San Jose. Underground telephone cables are maintained and operated by Pacific Bell and AT&T. Underground gas and electricity lines are maintained by the Pacific Gas and Electric (PG&E) Company.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

According to CEQA Guidelines, a project could have a significant effect in the environment if the project interferes with emergency response plans or emergency evacuation plans.

Preferred Project

Less-Than-Significant Impacts

Security problems requiring police protection may arise following implementation of the City's plans for trails, theme areas and other features of the proposed Guadalupe River Park. Potentially significant impacts to police services would thus be largely associated with recreational uses of the park corridor, which are not proposed as part of this project and are therefore not evaluated in this EIR/EIS (Pearson 1990).

Beneficial Impact

Following completion of the flood control project, the overall effect on fire service should be beneficial. Fire responses would not be subject to the difficulties and delays currently encountered in these areas due to flooding and companies operating in these areas would likely be more efficient in their emergency and firefighting responsibilities (Osby 1990).

No impacts to solid waste services are anticipated as a result of this project.

No adverse operational impacts on the City's parks would result from the project. Use of the new Guadalupe River Park would not be adversely affected by the flood control project.

Construction Impacts

Impact PSU-1: Possible Impediments to Police and Fire Protection Services. During construction, the project is anticipated to cause minor traffic problems, occasional trespassing in vacant land and within the construction zone, and incidental events that would call for police services. During construction, response times for fire protection would be temporarily increased in some areas. Response would be increased by about one minute during construction of the bridge on West Virginia Street (Reach 6) and during the construction of bridges or culverts on Willow Street and West Alma Avenue (Reach 7). Similarly, response times would be increased by about a minute during replacement of the Willow Glen Way

Bridge, and the Curtner Avenue Bridge (Reach 10A). During construction of the Hillsdale Avenue Bridge, it would be necessary to modify response routes for some fire companies (Reach 10 C). Management of bridge closures and detours during construction is discussed in the Traffic section of this EIR/EIS. The City's proposed Guadalupe River Park, which includes construction of trails, theme areas, and other recreational features, may be associated with public services impacts.

Impact PSU-2: Potential Disruption to Wells. Two wells operated by the San Jose Water Company could be adversely affected during the construction period: one by Willow Glen Way adjacent to Reach 9 of the project and the other immediately downstream of the Ross Creek Channel inlet on the west side of the River in Reach 11.

Impact PSU-3: Relocation of Utilities. During construction, a number of utilities such as pump stations and PG&E power poles would require relocation in all reaches. Underground utilities such as gas and power lines would require relocation during channel and bridge construction. Relocation of utilities may result in short-term service interruptions to surrounding areas.

Mitigation Measures

Mitigation Measure PSU-1: Notify Police and Fire Protection Services Regarding Construction. During the construction period, the District would notify the City of San Jose Police Department regarding road closures or other activities that would be likely to impede delivery of police services. Contact would also be made with the Crime Prevention Unit to ensure that the project site and residents in the vicinity are visible and accessible by emergency vehicles.

The City's Fire Department requests similar notice of road closures during the construction period. The Department would need a 60-day advance notice to plan for modified responses to accommodate the constrictions or closures of West Virginia Street, Willow Street, West Alma Avenue, Willow Glen Way, Curtner Avenue, Hillsdale Avenue, and the areas south of Canoas Creek along Nightingale Drive. County Communications would also be notified of all road closures.

Mitigation Measure PSU-2: Relocate Wells and Utilities Before Construction. Relocation of the water wells in Reaches 9 and 11 must occur before construction begins. In order to prevent interruption of service, SCVWD would prepare and secure utility agreements and excavation permits from the San Jose Water Company and, if necessary, PG&E, to have utilities moved prior to the project's initiation.

Mitigation Measure PSU-3: Coordinate Relocation of Utilities. Whenever utilities are moved, a Utility Excavation Permit must be obtained from the San Jose Public Works Department prior to the initiation of project construction. The general conditions and requirements of such permits include the project's working hours, necessary traffic control devices, trench backfill and pavement restoration methods and coordination with other construction projects in the general vicinity. In addition, the SCVWD would need to secure from the department both standard and special encroachment permits. Utility excavation

permits should be issued to utility companies with franchise agreements with the City of San Jose (Khouzam 1990). Relocation of utilities would be coordinated with the appropriate utility company. All utilities relocation would be performed by the appropriate utility company unless directed otherwise by the company. Any damage to utilities would be repaired.

Residual Impacts After Mitigation

There would be no residual impacts after implementation of the recommended mitigation measures.

Minimize Vegetation Impacts Alternative

Construction of an open by-pass channel in Reaches 9, 10A and 11 could result in disruption to sewer and water pipes and could require relocation of utilities. Significant public services and utilities impacts could occur during construction. Mitigation measures identified for the Preferred Project would also apply to the MVI Alternative.

No Project Alternative

There would be no impacts with the No Project Alternative. No mitigation would be required.

4.11 PUBLIC SAFETY

Affected Environment/Setting

Safety concerns in the Guadalupe River channel are primarily associated with potential flooding along the River. Because the existing channels within the project area cannot accommodate a one-percent flood event, portions of the project site and vicinity are subject to flooding and damage. Historic floods on the Guadalupe River caused extensive damage to the San Jose and Alviso areas and near bankfull conditions and minor flooding have occurred in several recent storms. Property damage has been the major impact from flooding, rather than loss of life.

Currently, access to the river channel has been limited by fences and gates at the top of the channel banks. This discourages public access from adjacent residential and commercial uses and reduces security problems in many areas.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

According to the CEQA Guidelines, a project would have a significant effect on the environment if it would create a potential public health hazard or involve the use, production or disposal of materials that pose a health hazard to people or animals or plant populations in the area affected. Potential risks from hazardous materials are discussed in Section 4.4 of this EIR/EIS.

Public safety concerns of the project would be associated with: 1) temporary hazards related to construction activities in and around residential and commercial areas, and 2) potential hazards associated with public access to the river channel corridor after completion of the project. Completion of the project would have an overall positive effect on public safety by reducing flooding hazards in the upper Guadalupe River corridor.

Preferred Project

Construction Impacts

Impact PS-1: Potential Public Safety Impacts Due to Access and Unauthorized Entry to the Construction Areas Along the River. Public access and unauthorized entry into project construction areas might result in public safety hazards, despite existing limitations on access to the channel. Rivers and canals are an attractive nuisance to children and unsupervised entry to the River and other flood control facilities could result in injury or death.

Impact PS-2: Roadway and Bridge Construction Hazards to Vehicles and Pedestrians. Construction in and adjacent to roadways, bridges and pedestrian walkways could create hazards for passing vehicles and pedestrians. Constricted roadways, large construction vehicles, and detours could present traffic hazards.

Operational Impacts

Impact PS-3: Potential Public Safety Impacts Due to Long-term Security and Access Control Along and Adjacent to the River. After project completion, public safety hazards would result from public access and unauthorized entry into the river channel and other flood control facilities. Culvert and bypass inlets and outlets that are accessible to the public could create an attractive nuisance which could result in misdemeanors and potential injuries.

Mitigation Measures

Mitigation Measure PS-1. Provide Warning Signs and Install Fencing and Barricades at Construction Sites. Project construction areas should be posted with warning signs and should be adequately fenced and barricaded or equipped with other security measures to prevent unauthorized access during construction.

Mitigation Measure PS-2a. Identify Truck Routes and Construction Zones Prior to Project Commencement. Prior to commencing construction activities for any phase of the project, access routes for construction truck traffic should be identified and posted. Routes into construction areas should, to the maximum extent practical, avoid residential areas. Construction zones should be clearly marked and posted, and flag personnel used wherever necessary to direct traffic.

Mitigation Measure PS-2b. Notify Residents of Construction Schedules and Proposed Traffic Detours. Notification should be given to residents and businesses in the surrounding area before construction begins. Alternate traffic and pedestrian routes for impacted areas should be posted.

Mitigation Measure PS-3. Limit Public Access to the River Channel by Installing Fencing and Posting Signs. Permanent warning signs (e.g., no entry, no swimming or diving), fencing, barricades and/or other access control measures should be erected in areas along the channel, where necessary, to restrict or prohibit public access.

Residual Impacts After Mitigation

Public safety impacts identified above would be reduced to a less-than-significant level with implementation of the recommended mitigation measures.

Minimize Vegetation Impacts Alternative

Public safety impacts of the MVI Alternative would be similar to those identified for the Preferred Project. Mitigation measures recommended for the Preferred Project should also be implemented under this Alternative.

No Project Alternative

There would be no construction-related public safety impacts under the No Project Alternative. The existing potential for flood damage would remain unchanged. Potential public safety impacts from unauthorized access would be similar with the No Project Alternative, and Mitigation Measure PS-3 is recommended.

4.12 VEGETATION

Affected Environment/Setting

Methods (Data Collection)

Vegetation Mapping

Vegetation surveys in the project area were conducted by The Habitat Restoration Group in 1986, 1989, and 1990. Major habitat types were identified on the basis of Holland's (1986) Preliminary Descriptions of the Terrestrial Natural Communities of California. A cumulative list of all plants seen in the project area was prepared (Appendix V-A).

Patches (polygons) of uniform habitat type within the project area were mapped on 1994 aerial photographs at a scale of 1 inch = 100 feet. The polygon boundaries for all reaches were digitized using a geographic information system (GIS) to measure vegetation acreage. The minimum polygon size was approximately 0.01 acre.

Riparian Forest Fragmentation Analysis

An analysis of riparian forest habitat fragmentation was conducted for pre-project and post-project conditions in Reaches A and 6-12. The purpose of the analysis was to estimate the amount of reduction or increase in riparian forest fragmentation following implementation of all mitigation plantings in the Preferred Project.

The pre-project habitat maps (Plates V-1 through V-17 in a separate volume) and the post-project habitat maps (Plates V-41 through V-53) were used to identify and measure the lengths of riparian forest patches and gaps between riparian forest. The length of each riparian patch was measured roughly parallel to the river bank from its farthest downstream to farthest upstream points. Gaps were measured as the shortest distance between neighboring patches. Habitats along the east and west banks were measured separately and summed for each reach. All measurements were rounded to the nearest 10 feet and should be regarded as approximations only.

Sources of inaccuracy include generalization of vegetation patches during mapping, the generally conservative dimensions of mitigation polygons (because they are based on ground-level planting area, not mature canopy dimensions), and the small scale of the maps used (1 inch = 200 feet). The limitations of this method include not addressing the values associated with patch width or area, and not integrating patches and gaps on both sides of the river. Nevertheless, the method is adequate for a relatively simple and rapid comparison of riparian forest length and gaps in riparian habitat before and after project construction.

Tree Inventory

The Habitat Restoration Group inventoried trees in each portion of the project area by species and size class to provide information needed in the wildlife Habitat Evaluation Procedures (HEP) model and in the vegetation impact assessment. Trees were identified by species and

characterized as to size class (girth), canopy closure class, and bank location (relative to top and toe of bank). Most of the trees on Ross and Canoas creeks are not within the District right-of-way, but were inventoried because of their proximity to proposed construction.

Nine tree size classes and four canopy closure classes were assigned according to categories used in the Wildlife Habitat Relationships Program (Jones & Stokes Associates 1988) (Appendix V-C). Size classes were estimated visually for trees rooted where access was difficult, including some trees on private property in Reaches 6-8. All trees larger than 2 inches diameter at breast height (DBH) were included in the inventory.

Bank locations were designated as follows (Appendix V-C):

- A = channel bottom (below the toe of slope),
- B = toe of slope,
- C = lower slope (to 6 feet above the toe),
- D = midslope (6 feet above the toe to 6 feet below top),
- E = upper slope (6 feet below to the top of slope), and
- F = top of bank and above.

Size-age relationships were developed for 6 western sycamores and 38 Fremont cottonwoods to help estimate growth rates in the riparian forest. Tree diameters were measured and increment cores were extracted at breast height (4.5 feet above the ground) in each of the sampled trees. All trees were assumed to be 4 years older than the number of rings counted to account for early growth before the tree was 4.5-feet tall.

Ordinance Trees

The City protects trees greater than 18 inches DBH under the City's tree ordinance as "ordinance trees." "Heritage trees" are ordinance trees that have been "found by the City Council to have a special significance to the community" because of their history, girth, height, species, unique quality, or other factors (San Jose Code Chapter 13.28). The District will be required to consult the City Arborist, obtain a tree removal permit, and meet City mitigation requirements for trees that are outside District property, but not for trees that are on District property (Beaudoin 1993 and Hamilton 1993).

Ordinance trees in the project area were identified as all trees larger than 20 inches DBH in the tree inventory conducted by The Habitat Restoration Group. Ordinance trees between 18 and 20 inches DBH were not identified because 18 inches was not used as a size-class limit in the tree inventory; however, few trees between 18 and 20 inches DBH were expected to be affected by the project. Heritage trees in the project area were identified by reviewing a list of the addresses of heritage trees provided by the City (draft City Council resolution dated September 1, 1988).

Wetland Delineation

Wetlands and other jurisdictional waters of the United States (areas subject to regulation under Section 404 of the Clean Water Act) were delineated by the District in June and July 1995. The delineation encompassed Reaches 6-13, Ross Creek, and Canoas Creek. Only anticipated impact areas were delineated in Reach A.

The delineation followed procedures described in the U.S. Army Corps of Engineers wetland delineation manual (Environmental Laboratory 1987). The delineation was reviewed and verified by the Corps (San Francisco District) in early 1996. Specific methods and results of the delineation are described more fully in the District's wetland delineation report (Santa Clara Valley Water District 1995-1996).

Special-Status Plants

Special-status species are plants that are legally protected under state and federal Endangered Species Acts or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status plants are species in the following categories:

- Plants listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.12 [listed plants] and various notices in the Federal Register [proposed species]);
- Plants that are candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (61 Federal Register 7596-7613, February 28, 1996);
- Plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- Plants listed under the California Native Plant Protection Act (Cal. Fish and Game Code, Section 1900 et seq.);
- Plants that meet the definitions of rare or endangered under the California Environmental Quality Act (CEQA) (State CEQA Guidelines, Section 15380);
- Plants considered by the California Native Plant Society (CNPS) to be "rare, threatened, or endangered in California" (Lists 1b and 2 in Smith and Berg 1988); and
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in Smith and Berg 1988), which may be included as special-status species on the basis of local significance or recent biological information.

Information on potential occurrences of special-status plants in the project area was gathered from the California Department of Fish and Game's (DFG's) California Natural Diversity Data Base (1990), CNPS (Skinner and Pavlik 1994), specialists from USFWS (White, pers. comm.) and observations during field surveys by The Habitat Restoration Group.

Regional Setting

Before Santa Clara Valley was settled by European-Americans, extensive riparian vegetation occurred along the many creeks of the region. Five major streams make their way from the Santa Cruz and Diablo ranges to empty into San Francisco Bay: Coyote Creek, Guadalupe River, Stevens Creek, San Francisquito Creek, and Calabazas Creek. The banks of the streams and arroyos, prone to overbank flooding in the winter, supported a diverse and biologically rich habitat, densely wooded with cottonwoods, willows, and sycamores (Bolton 1927).

After more than two centuries of agriculture, cattle grazing, and urban development in the valley and the alteration of the region's streambanks, the overall extent and condition of existing riparian vegetation has been severely reduced. The floodplain and high terraces of the river, once dominated by valley oaks (*Quercus lobata*) and sycamores (*Platanus racemosa*), have been converted to orchards, farmlands and, more recently, urban development. In many areas, the banks of the creeks remain dominated by Fremont cottonwood (*Populus fremontii*), willows (*Salix* spp.), and box elder (*Acer negundo* ssp. *californicum*). A major portion of the native riparian vegetation in this area has been altered. The remaining riparian vegetation in the Santa Clara Valley is broken into narrow, disjunct stands quite unlike the historic vegetation.

Local Setting

Guadalupe and Alamitos creeks originate in the eastern Santa Cruz Mountains from the summit of Loma Prieta. The Guadalupe River begins at the confluence of Guadalupe and Alamitos creeks, and supports a dense corridor of riparian vegetation over much of its 11.5-mile length. As the River flows north toward San Francisco Bay, three tributaries join the Guadalupe: Ross Creek from the west, Canoas Creek from the east, and Los Gatos Creek from the west. The lower portions of Ross and Canoas creeks have been channelized; the lower portion of Los Gatos Creek remains in a relatively natural condition.

General Factors Affecting Vegetation

Historically, substantial losses of natural vegetation have occurred on portions of Guadalupe River. Elevated flows in Canoas Creek from 1983 to 1992 (refer to "Groundwater Pumping" in the "Fisheries" chapter) may have supported additional streamside vegetation growth in Guadalupe River below the mouth of Canoas Creek (below the upstream end of Reach 10A). These flows are expected to decline because of reduced groundwater pumping along Canoas Creek in 1992 and subsequent years (Talley 1992). Some decline in woody and herbaceous growth may occur along the lower slopes of banks in Reach 10A and lower reaches as a result of decreased groundwater inputs in Canoas Creek.

Riparian vegetation is nearly continuous along both banks of Guadalupe River from I-280 to Curtner Avenue (Reaches 6-9). The vegetation has been altered by a variety of land uses in the area from Curtner Road to Blossom Hill Road (Reaches 10-12). Reach A and Guadalupe Creek have been widened to improve flood conveyance. Canoas Creek formerly entered the Guadalupe River near Auzerais Avenue, about 3 miles downstream of the present confluence.

A canal known as the Lewis Canal was dug in Reach 8 of the Guadalupe River sometime after 1866 from Willow Glen Way to near Willow Street to alleviate flooding in adjacent orchards. As a result, the present channel in Reach 8 is noticeably straighter than both the upstream and downstream sections.

Vegetation throughout the project area has been degraded or altered by dumping of debris, grading along the top-of-banks, clearing for maintenance, and introduction of non-native plants. Unauthorized human habitation and foot traffic along the River have trampled vegetation in some areas.

Habitat Types

Seven vegetation types were recognized in the project area as described below. Appendix V-A contains a list of all plant species observed during surveys of the project area. All areas of freshwater marsh habitat and portions of the riparian forest habitat qualify as jurisdictional wetlands under Section 404 of the Clean Water Act (Santa Clara Valley Water District 1995-1996). Results of the tree inventory are described in Appendix V-C.

Riparian Forest. Riparian (streamside) forest vegetation in the project area has a tall overstory of deciduous broadleaf trees (primarily cottonwoods and sycamores) and a dense understory of young trees, shrubs, and herbaceous plants. Several factors influence the composition of the riparian forest, including water availability, winter flooding and scouring, seed dispersal, and competition for sunlight. Overall patterns of species composition generally correlate with location on the river bank.

Lower banks and sand bars (bank zones A and B) are dominated by willows and Fremont cottonwood saplings. In these areas, water and sunlight are abundant, inundation is common in winter, and soil is frequently scoured or deposited.

Mid-bank areas (zones C and D) are dominated by box elder, California black walnut (*Juglans hindsii*), blue elderberry (*Sambucus mexicana*), California buckeye (*Aesculus californica*), and non-native elm (*Ulmus* sp.) and black locust (*Robinia pseudoacacia*), along with the willows and cottonwoods of the lower banks. The understory is dominated by young trees, blackberries (*Rubus* spp.), poison oak (*Toxicodendron diversilobum*), and numerous herbs and grasses. This vegetation is adapted to less soil moisture and less frequent inundation.

Upper banks and top-of-banks (zones E and F) are dominated by California black walnut, valley oak, coast live oak, sycamore, and blue elderberry. Non-native trees such as blue gum eucalyptus (*Eucalyptus globulus*), California pepper tree (*Schinus molle*), various Prunus, and glossy privet (*Ligustrum lucidum*) are also common, especially in disturbed sites.

Fremont cottonwoods of all size classes are abundant in the riparian forest of Reaches 6-11. Their abundance is evidence of sunny, open, moist conditions that favor growth of cottonwood seedlings and suckers. Relatively young black locusts (weedy, non-native trees) are also abundant in these areas, reflecting the disturbed condition of the riparian corridor. Black locust has similar establishment and growing requirements to cottonwood but appears

to colonize disturbed areas faster than cottonwoods. Once established (by prolific root suckering), black locusts can preclude the establishment of shade-intolerant cottonwoods.

Ruderal Herbaceous. Ruderal vegetation consists of native and introduced plants that occur in disturbed habitats and waste places. Ruderal herbaceous vegetation in the project area is primarily non-native. Dominant plants typically include Bermuda grass (*Cynodon dactylon*), black mustard (*Brassica nigra*), cocklebur (*Xanthium strumarium*), fennel (*Foeniculum vulgare*), field mustard (*Brassica campestris*), horseweed (*Conyza canadensis*), Italian thistle (*Carduus pycnocephalus*), perennial peppergrass (*Lepidium latifolium*), prickly lettuce (*Lactuca serriola*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus mollis*), white sweet clover (*Melilotus albus*), wild oat (*Avena barbata*), wild radish (*Raphanus sativus*), and yellow star-thistle (*Centaurea solstitialis*). Other plants often seen in ruderal herbaceous vegetation are bristly ox-tongue (*Picris echioides*), curly dock (*Rumex crispus*), giant reed (*Arundo donax*), horehound (*Marrubium vulgare*), nut grass (*Cyperus esculentis*), poison hemlock (*Conium maculatum*), and teasel (*Dipsacus fullonum*). The ruderal herbaceous community often extends into the adjacent riparian forest as understory.

Ruderal Scrub. Shrubby ruderal vegetation in the project area is generally dominated by coyote brush (*Baccharis pilularis var. consanguinea*), blackberry (*Rubus ursinus*), and Himalaya berry (*R. procerus*). Poison oak (*Toxicodendron diversilobum*) and castor bean (*Ricinus communis*) may also be prevalent. Ruderal herbaceous vegetation usually occurs between or beneath the shrubs.

Upland Landscaping. Trees and shrubs have been planted for landscaping throughout the project area. Much upland landscaping occurs beside buildings and roads at the top-of-bank and is adjacent to, or encroaches upon, the riparian corridor. The most common trees are blue gum eucalyptus (*Eucalyptus globulus)*, coast redwood (*Sequoia sempervirens*), olive (*Olea europea*), holly oak (*Quercus ilex*), California pepper (*Schinus molle)*, tree-of-heaven (*Ailanthus altissima*), and Monterey pine (*Pinus radiata*), none of which are native to the project area.

Urban Forest. For the purposes of this document, urban forest is defined as trees and shrubs located in and around residential and commercial areas (primarily residential garden plants and street trees), excluding the riparian corridor and upland landscaping. Common species include black acacia (*Acacia melanoxylon*); tree-of-heaven (*Ailanthus altissima)*; citrus (*Citrus* spp.); loquat (*Eriobotrya japonica*); plum, peach, and apricot (*Prunus* spp.); sycamores (*Platanus* sp.), and elms (*Ulmus* spp.).

Freshwater Marsh. Freshwater marsh vegetation is characterized by herbaceous plants growing in shallow water or wet soil on banks and gravel bars along the Guadalupe River, Ross Creek, and Canoas Creek. Dominant plants include various non-native and native forbs and grasses, including curly dock (*Rumex crispus*), nut-sedge (*Cyperus* spp.), sweet-clover (*Melilotus* spp.), and creeping water-primrose. Patches of cattail (*Typha* sp.) and tule (*Scirpus* spp.) are also present in some areas (particularly Reach 13).

Freshwater marsh generally occurs in small, scattered patches. All of these patches were included in the wetland delineation, but only the largest patches are shown in the habitat maps.

Other Habitats. Three other categories of unvegetated or sparsely vegetated habitat were recognized in the habitat mapping:

- Unvegetated habitat is exposed earth with little or no vegetative cover, or land covered by structures or pavement.
- Revetment is a facing on the channel side of material such as stone gabions, concrete, or riprap used for bank stabilization.
- River is the portion of the low-flow channel that was watered when aerial photographs used for habitat mapping were taken.
- Jurisdictional wetlands and other waters of the United States were delineated separately from and later than all of the habitats described above. See page 4.12-14 and the District's wetland delineation reports (Santa Clara Valley Water District 1995-996) for definitions and discussions of these habitats.

Vegetation Types and Conditions by Reach

This section describes the distribution and condition of the habitat types described above in each portion of the project area. Table 4.12-1 lists acreage of each vegetation type for each reach. Plates V-1 through V-20 (in a separate volume) are maps of pre-project habitats in each reach. Figure 4.12-1 illustrates acreages of existing forests and jurisdictional waters.

Reach A: Highway 101 to Interstate 880. Reach A is 10,090 feet long (Plates V-1 through V-4, in a separate volume). Near Airport Boulevard and Highway 101, the west bank has been stabilized with sacked-concrete and riprap for 320 feet, including the riprap underneath the bridge. Drainage outfall pipes lined with concrete are scattered on both banks throughout the reach. Principal habitats in this reach are ruderal herbaceous, ruderal scrub, riparian forest, and freshwater marsh.

Although Reach A contains more acres of riparian forest than any other reach, Reach A is also much longer than any other reach, and riparian forest in Reach A is relatively sparse and fragmented. Riparian forest in Reach A consists of scattered small groves 50-250 feet wide that are dominated by cottonwood, willow, black walnut, and elderberry. Non-native trees include Prunus, holly oak, blue gum eucalyptus, redwood, and mulberry (*Morus* sp.) on the upper slopes and top-of-bank. The herbaceous understory is sparse, consisting of mugwort (*Artemisia douglasiana*), ricegrass (*Oryzopsis miliacea*), fennel, nettles (*Urtica holosericea*), and black mustard. The scant shrub layer, where present, includes coyote brush and young elderberry.

Ruderal herbaceous vegetation occupies large areas of the reach, mostly on the bench. Ruderal scrub vegetation occurs mostly on upper slopes.

Table 4.12-1. Acreages of Existing Habitat

Reach	Riparian and Upland Habitats					Jurisdictional Waters	
	Riparian Forest	Urban Forest	Ruderal Scrub	Ruderal Herbaceous	Upland Landscaping	Wetlands	Other Waters
A	10.87	--	10.71	21.11	10.85	0.69	0.25
6	2.87	4.56	0.57	0.40	0.73	0.19	2.08
7	4.24	--	1.29	0.37	0.35	0.03	3.88
8	1.64	1.97	--	0.04	0.05	0.02	1.06
9	8.97	0.80	0.48	0.11	--	0.06	4.68
10A	1.45	--	0.37	0.06	--	0.18	1.14
10B	1.08	--	2.24	4.18	4.18	2.34	2.67
10C	3.54	--	0.83	1.23	0.37	0.08	2.18
11A	3.88	--	2.55	1.77	0.32	0.15	2.84
11B	1.06	--	0.82	0.32	0.69	0.03	0.98
11C	2.22	--	0.09	0.85	--	0.02	1.18
12	2.25	--	4.13	2.88	1.19	1.50	9.79
13	3.42	--	2.10	2.17	--	3.02	1.14
Canoas	--	0.79	--	0.97	0.03	0.05	1.34
Ross	--	1.33	--	2.63	--	0.39	1.41
Guadalupe River Subtotal	47.48	7.33	26.16	35.50	18.72	8.31	33.87
Tributaries Subtotal	--	2.12	--	3.59	0.03	0.44	2.75
Project Total	47.48	9.45	26.16	39.09	18.76	8.75	36.62

Notes:
Habitat types not included in this table are: unvegetated, revetment, river (included in "other waters"), and marsh (included in "wetlands").
Acreages of jurisdictional waters are from the wetland delineation prepared by the District (SCVWD 1995, 1996).

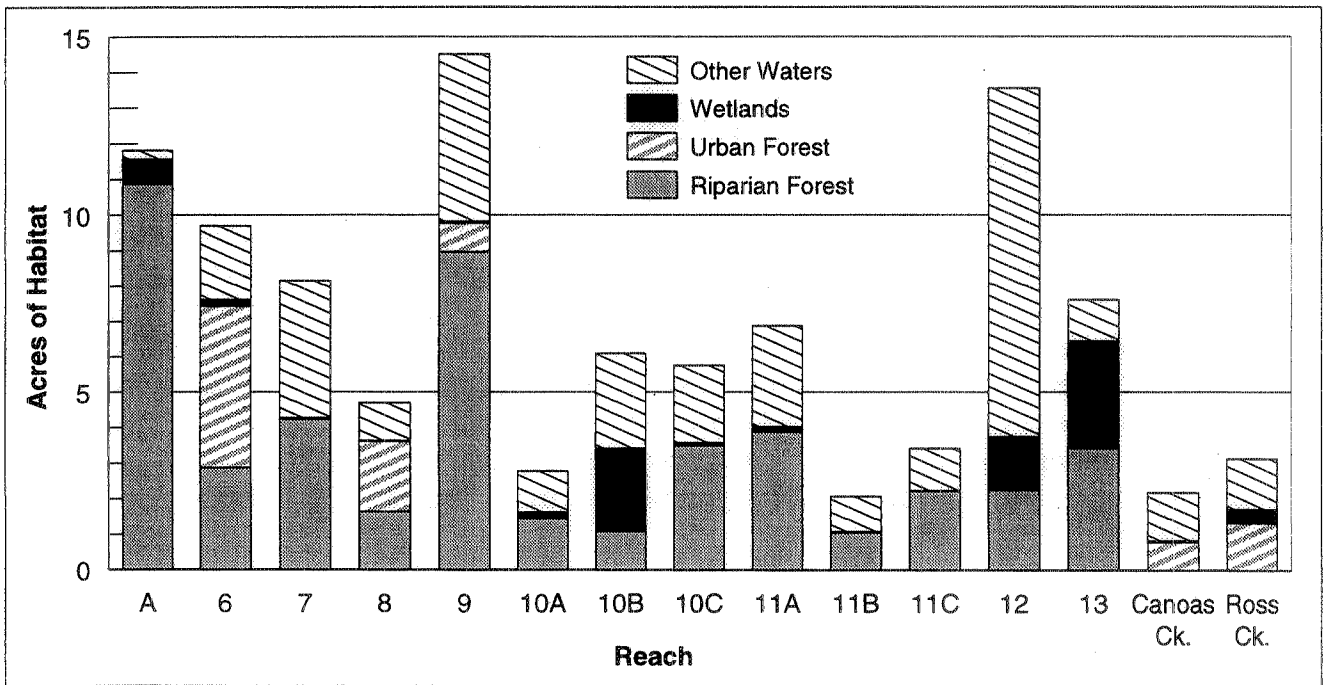


Figure 4.12-1. Acreages of Existing Forests and Jurisdictional Waters

Freshwater marsh occupies channel edges along most of the reach and occasionally forms dense patches.

Reach 6: Interstate 280 to Southern Pacific Railroad (SPRR) Tracks. Reach 6 is 2,600 feet long (Plate V-5, in a separate volume). Riprap occurs along 600 feet of the east bank between Virginia Street and the SPRR. The rest of the reach has a continuous riparian forest canopy 30-175 feet wide. Urban forest occurs outside the riparian zone in the residential area on the east side of the river.

Fremont cottonwood, California black walnut, and willows dominate the riparian forest along the lower and midbanks. The upper banks and tops of banks support blue gum eucalyptus, pepper tree, California black walnut, various Prunus, acacia, and scattered sycamores. A large grove of eucalyptus (over 40 trees) is located on the west bank at Virginia Street.

The understory in the riparian forest includes Himalaya berry, wild beet (*Beta vulgaris*), fennel, farmer's foxtail (*Hordeum leporinum*), ripgut brome, and other grasses. Almond (*Prunus amygdalus*) and glossy privet are scattered along the upper banks. Patches of giant reed occur along the lower and midbanks.

Common trees in the urban forest of Reach 6 are elm, tree-of-heaven, and English walnut (*Juglans regia*).

Reach 7: Southern Pacific Railroad Tracks to Union Pacific Railroad (UPRR) Tracks. Reach 7 is 3,700 feet long (Plates V-6 and V-7, in a separate volume). Two areas on the east bank (approximately 450 feet total) have been stabilized with riprap and sacked-concrete. The 30- to 125-foot-wide riparian forest canopy is fairly continuous and dense along the entire reach.

The dominant riparian trees on the lower and mid-banks include Fremont cottonwood, box elder, black walnut, willow, and non-native black locust and elm. The upper banks and tops of banks support elm, blue elderberry, box elder, and scattered individuals of privet, Prunus, pepper tree, sycamore, and blue gum.

The riparian forest understory is dominated by Himalaya berry, poison oak, Algerian ivy (*Hedera canariensis*), fennel, mugwort, periwinkle (*Vinca major*), cocklebur, and several grasses. Young willows, black walnuts, box elders, and black locusts are also present.

Reach 8: Union Pacific Railroad Tracks to Willow Glen Way. Reach 8 is 1,450 feet long, the shortest reach in the project area (Plate V-8, in a separate volume). Disturbed areas include 520 feet of sacked-concrete on the west bank and 60 feet of cleared land on the east bank. Riparian forest is continuous and dense along all of the east bank and most of the west bank and is 50-100 feet wide. Urban forest occurs outside the riparian zone in the residential area on the east side of the river.

Dominant riparian forest trees include Fremont cottonwood, box elder, blue elderberry, black walnut, and willow. Non-native trees include eucalyptus; black locust; and scattered Prunus, cypress, and pine. A grove of eucalyptus dominates the east and west banks near the UPRR.

Two sycamores occur on the west bank near Willow Glen Way. The area of sacked-concrete supports scattered box elder, black locust, cottonwood, and eucalyptus trees.

The riparian understory is dominated by Himalaya berry, poison oak, mugwort, giant reed, grasses, and various young trees and shrubs. The urban forest is dominated by tree-of-heaven, citrus, eucalyptus, privet, Prunus, elm, and pine.

Reach 9: Willow Glen Way to Curtner Avenue. Reach 9 is 4,630 feet long (Plates V-9 and V-10, in a separate volume). Disturbed areas include 650 feet of sacked-concrete along Almaden Road, 400 feet of sacked-concrete upstream of Malone Road, 620 feet of cleared bank near Curtner Avenue, and 240 feet of sacked-concrete on the west bank near Willow Glen Way. Riparian forest occupies most of the undisturbed areas. Small areas of urban forest occur outside the riparian zone in the residential area on the east side of the River between Willow Glen Way and Almaden Road.

The riparian forest has a dense, multi-layered canopy that is 30-200 feet wide, much of which overhangs and shades the channel. Dominant trees are cottonwoods, box elder, black locust, black walnut, and blue elderberry. Small Prunus and large sycamore trees are occasional in this reach.

The riparian forest understory includes Himalaya berry, poison oak, fennel, English ivy, and periwinkle. These plants often form impenetrable thickets on the bank. Several stands of giant reed are present, and freshwater marsh plants grow at the water's edge.

Large groves of cottonwood occur in this reach: one is between Willow Glen Way and Malone Road at the bend in the River and another is near Malone Road. Several large sycamores occur on the east bank between Willow Glen Way and Malone Road near the San Jose Water Company (SJWCo) well field.

Three large cedars (*Cedrus* spp.) designated by the City as heritage trees occur in the urban forest near Malone Road. The trees are in front yards on the far side of the lots, away from the Guadalupe River.

Reach 10: Curtner Avenue to Capitol Expressway. Reach 10 is 7,000 feet long and is divided into three sections (Plates V-11 through V-13, in a separate volume) as described below.

Reach 10A: Curtner Avenue to Canoas Creek. Reach 10A is 1,800 feet long. Riparian forest is nearly continuous and 40-200 feet wide along this subreach, but the canopy is sparser than that in Reaches 6-9. Dominant trees are cottonwood, sycamore, and box elder trees, intermixed with non-native black locust and Lombardy poplar (*Populus nigra*).

Reach 10B: Canoas Creek to Stream Gage Station No. 23B. Reach 10B is 3,160 feet long. Portions of Reach 10B have been altered by bank clearing and placement of stepped gabions. The channel was widened and moved eastward as part of the Almaden Expressway widening in 1972 and 1973.

Riparian forest occupies a relatively small area 40-75 feet wide on the east side of the River near the north end of this reach. Ruderal herbaceous and scrub vegetation covers much of the east side of the River. Upland landscaping occurs at the top of bank adjacent to Almaden Expressway, where redwood, pepper tree, and pines have been planted. Wetland vegetation occupies much of the channel bottom, which is seasonally without surface water in this reach.

The riparian forest is composed of scattered trees of willow, black walnut, sycamore, and valley oaks on the upper terrace. A portion of the bench along the east bank was planted with cottonwood, valley oak, coyote brush, and blue elderberry as part of a 1987 habitat mitigation project by Lincoln Property but the plantings were generally unsuccessful. The wetland vegetation consists primarily of non-native wet site weeds with small patches of native freshwater marsh plants. The habitat quality of this vegetation is relatively low because it is dry in summer and periodically scoured by high flows.

Reach 10C: Stream Gage Station No. 23B to Capitol Expressway. Reach 10C is 2,100 feet long. The channel bottom is concrete beneath the Hillsdale Avenue bridge. Riparian forest occupies most of this reach north of Hillsdale Avenue. A few patches of upland landscaping and ruderal herbaceous vegetation are also present. Ruderal scrub (mostly blackberry) and ruderal herbaceous vegetation predominate in the short segment between Hillsdale Avenue and Capitol Expressway.

The riparian forest is 100-275 feet wide and includes groves of sycamore along both banks, with several trees greater than 20 inches DBH. Vegetation on the west bank near Foxworthy Avenue is dense with sycamore, elderberry, walnut, and cottonwood. The understory is composed of blackberry and young trees.

Upland landscaping composed of Deodar cedar (*Cedrus deodara*) dominates the east bank near the fruit packing facility.

Reach 11: Capitol Expressway to Branham Lane. Reach 11 is 4,930 feet long and is divided into three sections (Plates V-14 and V-15, in a separate volume) as described below.

Reach 11A: Capitol Expressway to San Jose Water Company Property. Reach 11A is 2,960 feet long. Both the east and west banks have been disturbed.

Reach 11A supports a narrow strand of riparian forest 40-200 feet wide, surrounded by large patches of ruderal vegetation and upland landscaping. The riparian forest and other vegetation includes several large coast live oaks, sycamores, and valley oaks. Non-native trees are primarily black locust and eucalyptus.

Reach 11B: San Jose Water Company Property to Ross Creek. Reach 11B is 840 feet long. Most of the vegetation is ruderal vegetation, with occasional small groves of riparian forest 30-160 feet wide.

Several large native oaks grow along the top of the east bank. A large grove of eucalyptus is on the west bank near Bryan Avenue. Prickly-pear cactus (*Opuntia* sp.) grows along the east bank.

Reach 11C: Ross Creek to Branham Lane. Reach 11C is 930 feet long. Riparian forest is continuous and 100-150 feet wide along most of the east and west banks. Patches of ruderal vegetation occur beside Almaden Expressway near the north end of the reach and beside Branham Lane at the south end of the reach.

Trees along the east bank include mostly black walnut, valley oak, sycamore, and a large grove of black locust. Trees along the west bank are mostly cottonwood, black walnut, sycamore, and box elder.

Reach 12: Branham Lane to Blossom Hill Road. Reach 12 is 5,600 feet long (Plates V-16 and V-17, in a separate volume). The southern half of Reach 12 has been substantially altered by post-quarry and agricultural activities. Two percolation ponds are operated in the stream and percolation ponds out of the river channel are adjacent to and upstream of Reach 12. Most of the vegetation in this reach is ruderal. Riparian forest occurs only in scattered small patches about 50 feet wide, with no continuous canopy.

The scattered riparian trees are predominantly sycamore, with occasional blue elderberry, eucalyptus, and buckeye. Willow saplings are present along the water's edge.

Vegetation around the percolation ponds is a mixture of ruderal scrub and freshwater marsh. Ruderal scrub consisting of coyote brush, mule fat (*Baccharis viminea*), and elderberry is the most extensive vegetation type. Narrow bands of cattail and tule occur in freshwater marsh along the water's edge.

Reach 13: Blossom Hill Road to 700 Feet South of Drop Structure. Reach 13 is approximately 2,200 feet long (Plate V-54, in a separate volume) and contains a low dam called the Blossom Hill Drop Structure. This dam impounds water to varying depths, depending on how it is operated and maintained. Riparian forest and wetlands in Reach 13 are best developed south (upstream) of the drop structure. Ruderal scrub (dominated by coyote brush) is common on mid- and upper slopes below the check structure. Ruderal herbaceous vegetation (dominated by annual grasses) occurs primarily on the east bank along the entire reach.

Canoas Creek: Almaden Expressway to End of Nightingale Drive. The portion of Canoas Creek in the project area is 1,575 feet long (Plate V-18, in a separate volume) and meets the Guadalupe River in Reach 10. Ruderal herbaceous vegetation dominates most of the reach. Freshwater marsh vegetation lines the channel and ruderal vegetation dominates the banks. Urban forest occurs in the back yards of homes along the creek. Upland landscaping occurs between the backyard fences and the District service road. Most of these trees are eucalyptus, almond, and apricot.

Ross Creek: Guadalupe River to 700 Feet Upstream of Jarvis Avenue. The portion of Ross Creek in the project area is approximately 4,625 feet long (Plates V-19 and V-20, in a separate volume) and meets the Guadalupe River in Reach 11. The bank slopes are approximately 1.5:1, with near vertical slopes occurring at eroded sites, mostly on the south bank. Concrete bank stabilizations occur adjacent to Cherry Avenue. District maintenance roads follow the top-of-bank on both sides of the creek.

Much of this reach is unvegetated, and riparian vegetation is absent. Ruderal vegetation occurs along the channel edge and the lower slopes of both banks. Small amounts of cattail are present in the channel. Urban forest occurs occasionally between the backyard fences and the District maintenance roads.

Riparian Forest Fragmentation Analysis Results

Table 4.12-2 lists total patch and gap lengths, numbers of patches and gaps, and average patch and gap length for each reach under pre-project conditions for the Preferred Project alternative. Figure 4.12-2 shows total and average gap lengths by reach under pre-project conditions. Under existing conditions, gaps range in length from less than 50 to over 3,000 feet. Gap lengths are greatest in Reaches 10A (west bank), 10B (west bank), 11A (west bank), and 12 (south of future Chynoweth Avenue). Impacts are discussed in "Environmental Consequences" below.

Tree Inventory Results

The results of the tree inventory are based on surveys conducted by the Habitat Restoration Group in 1991. The following numbers are overestimated because of revisions to the project since 1991.

Numbers of Trees. The tree inventory counted and identified 9,366 trees ≥2 inches DBH in Reach A and Reaches 6-12. Table 4.12-3 summarizes the numbers of trees by habitat and bank in each reach of the project area. Figure 4.12-3 illustrates the relative abundance of trees by species. Full results of the inventory by species and size class are included in Appendix V-C (in a separate volume).

Size-Age Relationships. The results of the size-age relationship study are illustrated in the last two figures in Appendix V-C (in a separate volume). The Fremont cottonwoods sampled ranged from 13 to 125 years old and from 15 to 110 feet tall. Seventy-five percent were less than 35 years old.

Sycamores of a given size are generally older than cottonwoods of the same size, indicating that they grow more slowly. Sycamores in size class 3 (6-11 inches DBH) averaged 7 years older than cottonwoods (29 vs. 22 years). Sycamores in size class 4.2 (15-20 inches DBH) averaged 14 years older than cottonwoods (44 vs. 30 years). The sycamores sampled ranged from 30 to 68 feet tall.

Ordinance Trees. The tree inventory conducted by The Habitat Restoration Group (1991) documented 104 ordinance trees (≥20 inches DBH) in Reach A and 728 trees in Reaches 6-12 (Appendix V-C). No designated heritage trees are located in the riparian forest of the project area. Three designated heritage trees occur in the urban forest outside of Reach 9.

Table 4.12-2. Guadalupe River Riparian Forest Fragmentation Analysis

	Pre-Project Conditions					
	Riparian Forest Patches			Gaps Between Riparian Forest		
Reach	Total Length (ft)	No. of Patches	Average Length (ft)	Total Length (ft)	No. of Gaps	Average Length (ft)
A	4,110	22	187	6,120	22	278
6	3,780	9	420	1,360	9	151
7	5,420	17	319	2,750	17	162
8	2,320	5	464	450	6	75
9	7,610	11	692	1,670	10	167
10A	2,060	2	1,030	320	1	320
10B-C	3,880	14	277	6,780	16	424
11A-C	5,820	16	364	3,740	18	208
12	2,260	11	205	8,810	13	678
13	1,880	9	209	2,530	9	281
Total	39,140	116	337	34,530	121	285

Notes: Only the west bank was analyzed in Reach A because this project will not affect riparian vegetation on the east bank. All other reaches include both banks.

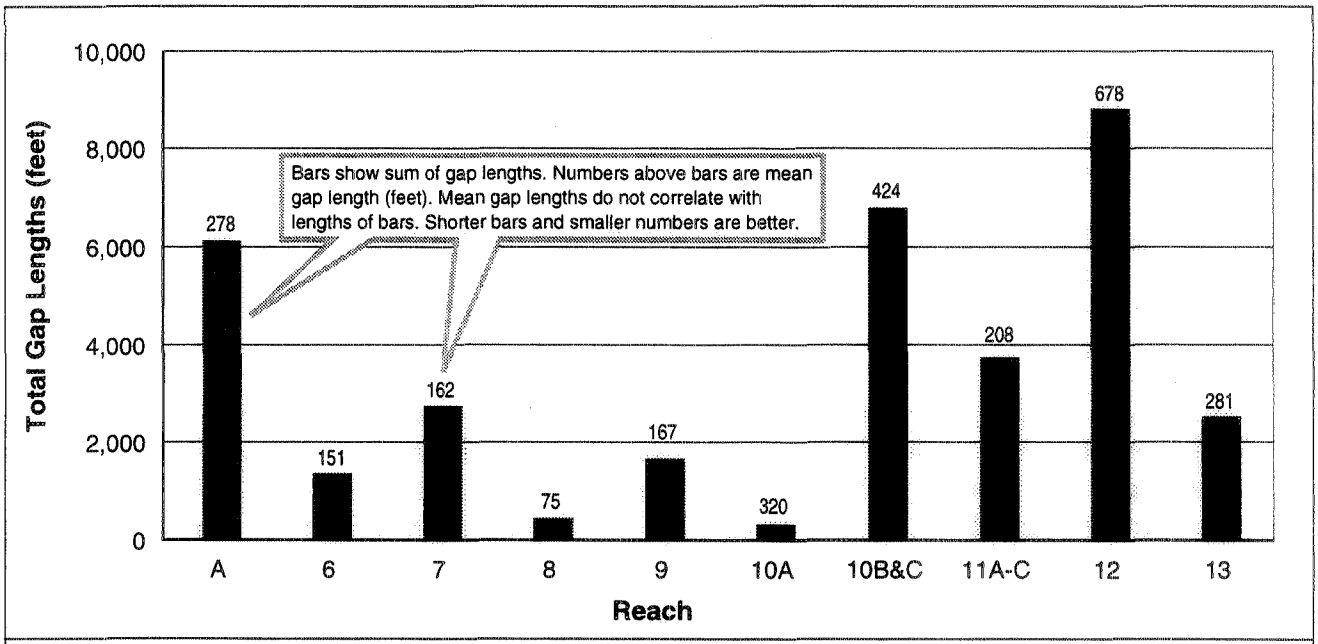


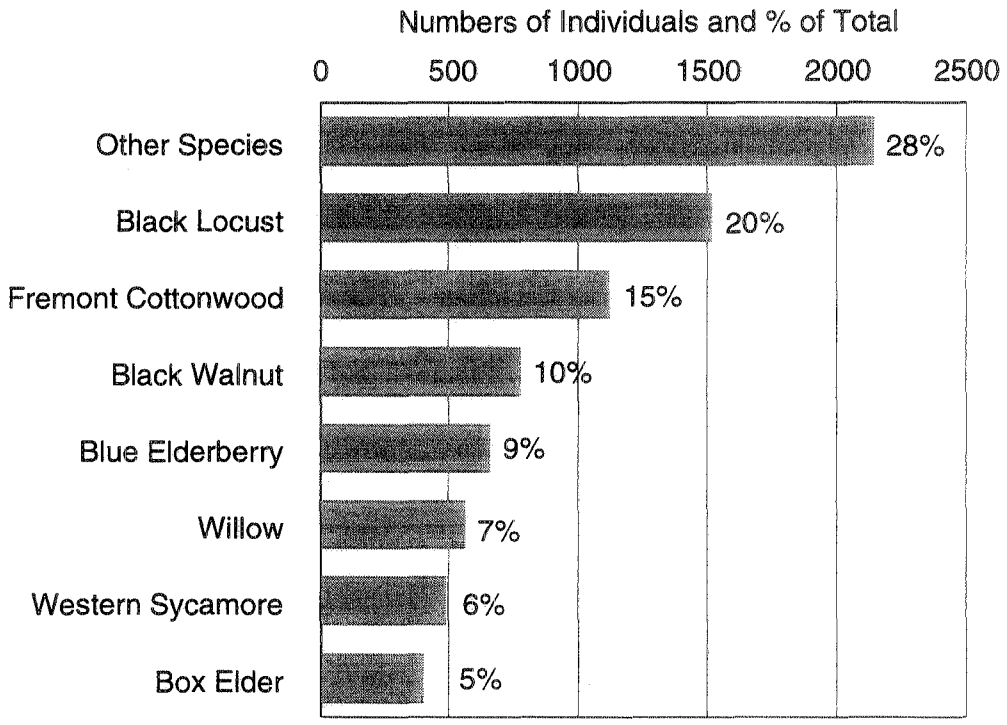
Figure 4.12-2. Pre-Project Gaps in Riparian Vegetation

Table 4.12-3. Inventory of Existing Trees

Reach	Habitat	Trees >2 Inch DBH			Trees >20 Inches DBH		
		East	West	Total	East	West	Total
A	Riparian forest	788	895	1,683	48	56	104
6	Riparian forest	307	385	692	30	72	102
	Urban forest	282	0	282	13+	0	13+
7	Riparian forest	463	475	938	33	41	74
	Urban forest	60	0	60	0	0	0
8	Riparian forest	280	171	451	52	33	85
	Urban forest	226	0	226	14+	0	14+
9	Riparian forest	854	971	1,825	79	111	190
	Urban forest	ND	0	ND	ND	0	ND
10A	Riparian forest	214	299	513	12	23	35
10B	Riparian forest	217	224	441	3	10	13
10C	Riparian forest	230	336	566	13	23	36
11A	Riparian forest	698	227	925	49	10	59
11B	Riparian forest	83	99	182	4	43	47
11C	Riparian forest	424	101	525	15	7	22
12	Riparian forest	315	310	625	15	22	37
13	Riparian forest	ND	ND	ND	ND	ND	ND
Ross	Urban forest	165 (north)	219 (south)	384	1	1	2
Canoas	Urban forest	50	76	126	--	--	--
6-12	Riparian forest	4,085	3,598	7,683	305	395	700
	Urban forest	568	0	568	27	0	27
Total	Riparian forest	4,873	4,493	9,366	353	481	834
	Urban forest	783	295	1,078	28	1	29

ND = no data.

Source: Habitat Restoration Group (unpublished data based on surveys conducted in 1991).



SOURCE: Habitat Restoration Group (unpublished data 1991)

Figure 4.12-3. Relative Abundance of Trees over 2 inches DBH in Reaches 6-12

Jurisdictional Waters of the United States

Wetlands are areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Tributary waters (also called "other waters") include the unvegetated portions of lakes and streams, typically below the ordinary high water mark.

The wetland delineation (Santa Clara Valley Water District 1995-1996) identified 8.75 acres of wetland and 36.62 acres of tributary waters in Reach A, Reaches 6-13, and on Ross and Caneas Creeks. The largest amounts of wetland occurred in Reaches 10B and 13 (upstream of the Blossom Hill drop structure). The largest amount of tributary waters occurred in Reach 12. Table 4.12-1 lists the acreages of jurisdictional wetlands and other waters of the United States by reach. These acreages are based on the final wetland delineation verified by the Corps in 1996.

Special-Status Plants

Table 4.12-4 lists plants identified by the USFWS as potentially occurring in the project area (White 1993); however, a review of available information on these species and field observations confirmed that none of these plants or their habitats are present in the project area. No plants that are state or federally listed or proposed for listing as threatened or endangered were observed or are considered likely to occur in the project area.

Valley oak is not included in Table 4.12-4 because it is currently considered by CNPS to be too common for consideration as rare or endangered (Skinner and Pavlik 1994). Approximately 33 valley oaks occur on the middle and upper banks of Reaches 6-12, primarily in Reaches 10 and 11.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Impacts on vegetation were considered significant if the project would result in any of the following:

- substantial loss of urban forest, native vegetation, or native plant habitat;
- removal, filling, grading, or substantial disturbance of a sensitive vegetation type (riparian vegetation and wetlands);
- directly or indirectly caused mortality of or injury to a heritage tree protected by local ordinance; or
- direct mortality, permanent habitat loss, or lowered reproductive success for:
  - individuals of state-listed or federally listed threatened or endangered plant species, or
  - substantial portions of local populations of candidates for state or federal listing or species identified by CNPS (Skinner and Pavlik 1994) as being rare, threatened, or endangered in California or elsewhere ("List 1b" species).

Table 4.12-4. Special-Status Plants Potentially Occurring in the Guadalupe River Flood Control Project Area

Scientific Name/ Common Name	Legal Status Federal/State/CNPS	Habitat	Distribution
Cirsium fontinale var. *campylon* Mt. Hamilton thistle	E/--1B	Chaparral, oak woodland, grassland on serpentine soils	Alameda, Santa Clara, and Stanislaus Counties
Clarkia cocinna ssp. *automixa* South bay clarkia	*C2/--/1B	Woodland	Alameda and Santa Clara Counties
Dudleya setchellii Santa Clara Valley dudleya	E/--/1B	Grassland on serpentine soils	Santa Clara County
Lasthenia conjugens Contra Costa goldfields	PT/--/1B	Vernal pools, moist sites in grasslands	Mendocino to Santa Barbara Counties
Plagiobothrys glaber Hairless allocarya	--/--/1A (presumed extinct)	Alkaline meadows and coastal salt marsh	Marin to San Benito Counties
Streptanthus albidus ssp. *albidus* Metcalf Canyon jewelflower	E/--/1B	Grassland on serpentine soils	Santa Clara County
Streptanthus albidus ssp. *peramoenus* Most beautiful jewelflower	*C1/--/1B	Chaparral and grassland on serpentine soils	Alameda, Contra Costa, and Santa Clara Counties

Status explanations:

Federal

E	=	listed as endangered under the federal Endangered Species Act
PT	=	proposed for listing as threatened under the federal Endangered Species Act
*C1	=	former Category 1 candidate for federal listing
*C2	=	former Category 2 candidate for federal listing
--	=	no status

State

--	=	no status

California Native Plant Society (CNPS)

1A	=	presumed extinct
1B	=	threatened or endangered in California and elsewhere

Riparian vegetation dominated by native or mature plants was considered more sensitive (having a lower threshold for impact significance) than riparian vegetation dominated by non-native, weedy, or young plants.

Impacts were considered less than significant if they would meet none of the criteria identified above. Impacts on ruderal scrub, ruderal herbaceous vegetation, and upland landscaping were considered less than significant because these are common habitats that are not considered to be sensitive.

Beneficial impacts include changes that would result in net increases in the extent or quality of native riparian, wetland, or upland vegetation. If substantial effects would occur, beneficial impacts were identified as significant.

Natural recovery time was considered in the determination of significance of impacts. Vegetation recovery periods vary from a few years (e.g., for ruderal herbaceous vegetation and small areas of freshwater marsh) to several decades (e.g., for mature riparian and urban forest). The type of resource and the type of impact determine the recovery time.

Construction Impacts

Construction impacts would result from removal of riparian and upland vegetation, stress or injury to vegetation adjacent to construction areas, and filling or removal of jurisdictional wetlands and other waters of the United States.

The following assumptions were made regarding construction-related impacts on vegetation.

- All existing vegetation would be lost in areas that are graded. Riparian forest, urban forest, and other vegetation types would be affected. On-site replacement would not be possible where bypass channels, floodway benches, gabions, and roads are constructed. On-site replacement or natural recovery would generally be possible in staging areas and where only minor recontouring would occur.

- Some of the vegetation outside but adjacent to grading and construction areas may be injured or stressed by collisions with heavy equipment, sidecasting of graded material, or compaction of soil if no specific measures are taken to avoid such impacts.

- Some existing wetlands and other waters of the United States would be filled, and additional areas would be cleared or excavated by grading. On-site replacement would not be possible where wetlands would be covered by revetment or converted to uplands. On-site replacement would be possible where revegetation could occur naturally and the duration of wetting would not be substantially diminished.

- Cofferdams would likely be needed for most construction activities. Cofferdams are temporary structures necessary to dewater the creek and allow access across the creek during construction. The estimated total volume of earthen fill for the cofferdams under 404 jurisdiction is 7,000 cubic yards based on the Ordinary High Water line.

The area of other waters of the United States to be filled temporarily by these structures is 1.06 acres. Typically, a driving hammer and crane would be operated from the banks of the creek to place the fill. A bypass pipe would be used to maintain downstream flows. Materials and the method of placement would be selected to prevent erosion or an increase in creek water turbidity. Upon completion of construction, all material used for the cofferdams would be removed and the bed and banks would be returned to preconstruction contours. Delineated wetlands would be avoided as cofferdam sites. The California Construction Best Management Practice (BMP) would be implemented.

Relatively open locations would be selected for placement of the cofferdams. As a result, overall impact should be minor. The other waters of the United States in the project area would be temporarily impacted during construction of the cofferdams. Since the cofferdams would be removed after construction, no long-term effects are expected. The potential locations of 25 cofferdams are shown on the engineering drawings.

- Removing portions of the existing riparian and urban forests during project construction could cause localized environmental changes that could lead to decreased plant vigor, vegetation cover, regeneration, and native species diversity in the remaining riparian forest. These effects could result from decreased shading, increased ground-level temperatures, increased exposure to wind, or decreased soil moisture from nearby garden irrigation. This impact may develop over a period of many years and may be difficult to attribute specifically to this project.

- No impacts on listed or proposed threatened or endangered plants would occur because no such plants occur in the project area. Impacts on valley oaks are discussed with impacts on riparian forest.

Operational Impacts

Operational impacts could result from changes in maintenance activities, such as periodic vegetation removal or trimming that is more extensive or frequent than present practices.

The following assumptions were made regarding operational impacts on vegetation:

- Existing channel maintenance tasks include: removing accumulated sediment; cleaning debris from in-channel structures; controlling erosion by placing riprap, sacked concrete, or other materials where needed; using pre-emergent and postemergent herbicides on maintenance roads and floodways and selectively in revegetation areas; removing trash and debris; inspecting and monitoring conditions; removing dead trees and pruning live trees that could be hazardous in floods; trimming brush that could impede flood flows; mowing or discing weeds; using herbicides on invasive weeds, noxious plants, and woody plants that could obstruct flood flows or cause structural damage; manual trimming of branches overhanging roadways; manual trimming or herbicide application in areas inaccessible to mechanical equipment; maintaining access roads; and repairing fences.

- Existing channel maintenance activities that affect native vegetation have been approved and monitored through Memoranda of Understanding (MOU) between the District and DFG. The proposed maintenance program presented in Appendix C would supersede the MOU between the District and DFG. The District is currently preparing a maintenance program EIR to consider the long-term environmental impacts of its District-wide sediment removal, erosion control, and vegetation management and maintenance programs. (The MOU between the District and DFG are included in Appendix I to the Engineer's Report.)

- Differences between existing and proposed channel maintenance procedures are minor. The most notable changes under the proposed project include more extensive sediment removal (in Reaches 9 and 11 and in bypasses in Reaches 6-8); less use of sacked concrete for erosion control; newly constructed roads and ramps that would be treated with preemergent and postemergent herbicides in accordance with applicable regulations; maintenance for new irrigation systems and mitigation plantings; less mechanical and chemical vegetation control (native vegetation would remain except in a 25-foot-wide strip centered on the existing low-flow channel in Reaches 6-12 and a 50-foot-wide strip in Reach A).

Preferred Project

Acreages of impacts on vegetation are summarized for each habitat by reach in Table 4.12-5. Figure 4.12-4 illustrates impacts on sensitive vegetation types for the proposed project. Plates V-21 through V-40 (in a separate volume) show impact areas overlaid on existing habitats.

Beneficial Impacts

Net Gain in Riparian Habitat Quality. Implementing the proposed mitigation measures would reduce the fragmentation of the riparian forest by approximately 38 percent. Many of the proposed mitigation sites would be in locations that currently lack riparian forest on one or both sides of the river. Total gap lengths would decrease substantially (120-4,940 feet) in Reaches 6-7 and 10-13. Total gap lengths would increase slightly (50-180 feet) in Reaches A, 8, and 9 (Table 4.12-6 and Figure 4.12-5).

Implementing the proposed mitigation measures would also increase the ratio of native to non-native trees and shrubs in the riparian forest. Many of the riparian forest areas to be removed during project construction currently contain a high proportion of non-native plants. Mitigation sites will be planted entirely with native species.

Net Gain in Riparian Habitat Acreage. Implementing the proposed mitigation measures would increase the amount of riparian forest by at least 20 percent (9.48 acres) over pre-project conditions within the project area. Riparian forest removed by construction would be replaced on a 2:1 basis.

Table 4.12-5. Impacts of the Preferred Project on Vegetation

	Riparian and Upland Habitats					Jurisdictional Waters	
Reach	Riparian Forest	Urban Forest	Ruderal Scrub	Ruderal Herbaceous	Upland Landscaping	Wetlands	Other Waters
A	0.19	--	1.84	1.10	1.70	0.80	0.03
6	0.20	3.93	0.05	0.08	0.24	0.002	0.17
7	0.53	--	0.58	0.02	--	--	1.82
8	0.24	1.01	--	--	--	--	0.25
9	2.80	0.20	0.42	0.01	--	0.02	1.16
10A	0.53	--	0.29	0.06	--	0.03	0.08
10B	0.12	--	0.83	2.29	0.86	0.28	1.25
10C	1.44	--	0.31	0.74	0.23	0.04	0.35
11A	2.20	--	0.66	1.46	--	0.10	0.75
11B	0.55	--	0.84	0.11	0.66	--	0.59
11C	0.63	--	0.08	0.66	--	--	0.35
12	0.03	--	1.05	0.28	0.12	0.02	0.88
13	0.01	--	0.07	--	--	0.16	0.03
Temporary Coffer Dams	--	--	--	--	--	--	1.06
Canoas	--	--	--	--	--	--	--
Ross	--	0.08	--	2.55	--	0.39	1.41
Guadalupe River Subtotal	9.48	5.15	7.02	6.81	3.81	1.46	8.75
Tributaries Subtotal	--	0.08	--	2.55	--	0.39	1.41
Project Total	9.48	5.23	7.02	9.36	3.81	1.85	10.16

Notes:

Habitat types not included in this table are: unvegetated, revetment, river (included in "other waters"), and marsh (included in "wetlands").

Impacts annotated on Plates V-21 through V-40 as "canopy" were excluded. Ground disturbance in these areas will not cause removal of overhanging riparian canopy.

Impacts annotated on Plates V-26, -27, and -30 as "erosion control sites" were excluded from this table. Some of the riparian vegetation in these sites was lost to erosion during the floods of January and March 1995. These losses and any impacts associated with the erosion control treatments (maximum 0.78 acre altogether) will be mitigated on-site on a 1:1 basis.

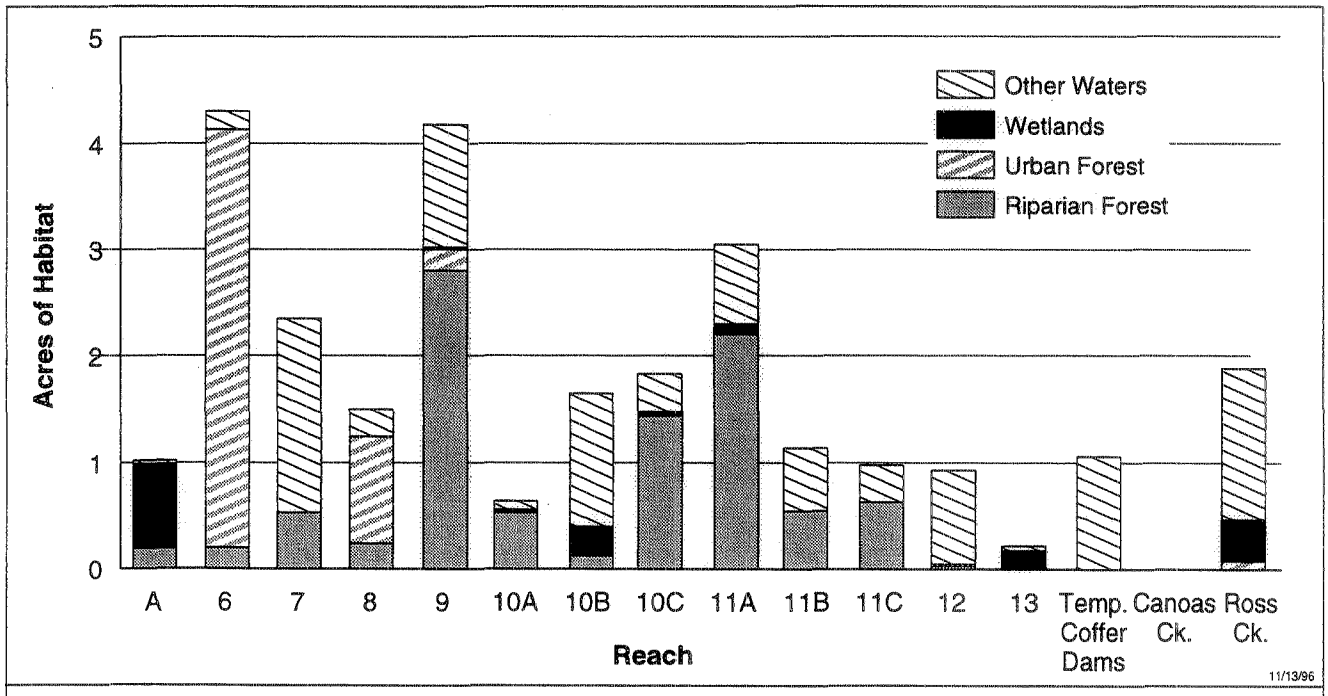


Figure 4.12-4. Impacts of the Preferred Project on Forests and Jurisdictional Waters

Table 4.12-6. Guadalupe River Riparian Forest Fragmentation Analysis

	Pre-Project Conditions						Post-Project Conditions					
	Riparian Forest Patches			Gaps Between Riparian Forest			Riparian Forest Patches			Gaps Between Riparian Forest		
Reach	Total Length (ft)	No. of Patches	Average Length (ft)	Total Length (ft)	No. of Gaps	Average Length (ft)	Total Length (ft)	No. of Patches	Average Length (ft)	Total Length (ft)	No. of Gaps	Average Length (ft)
A	4,110	22	187	6,120	22	278	3,960	20	198	6,270	20	314
6	3,780	9	420	1,360	9	151	4,120	7	589	980	7	140
7	5,420	17	319	2,750	17	162	6,590	14	471	1,660	14	119
8	2,320	5	464	450	6	75	2,130	4	533	630	4	158
9	7,610	11	692	1,670	10	167	7,490	12	624	1,720	11	156
10A	2,060	2	1030	320	1	320	2,160	2	1080	200	1	200
10B-C	3,880	14	277	6,780	16	424	9,440	7	1349	1,360	7	194
11A-C	5,820	16	364	3,740	18	208	6,500	9	722	2,870	10	287
12	2,260	11	205	8,810	13	678	7,210	13	555	3,870	13	298
13	1,880	9	209	2,530	9	281	2,700	10	270	1,690	9	188
Total	39,140	116	337	34,530	121	285	52,300	98	534	21,250	96	221

Notes: Only the west bank was analyzed in Reach A because this project will not affect riparian vegetation on the east bank. All other reaches include both banks.

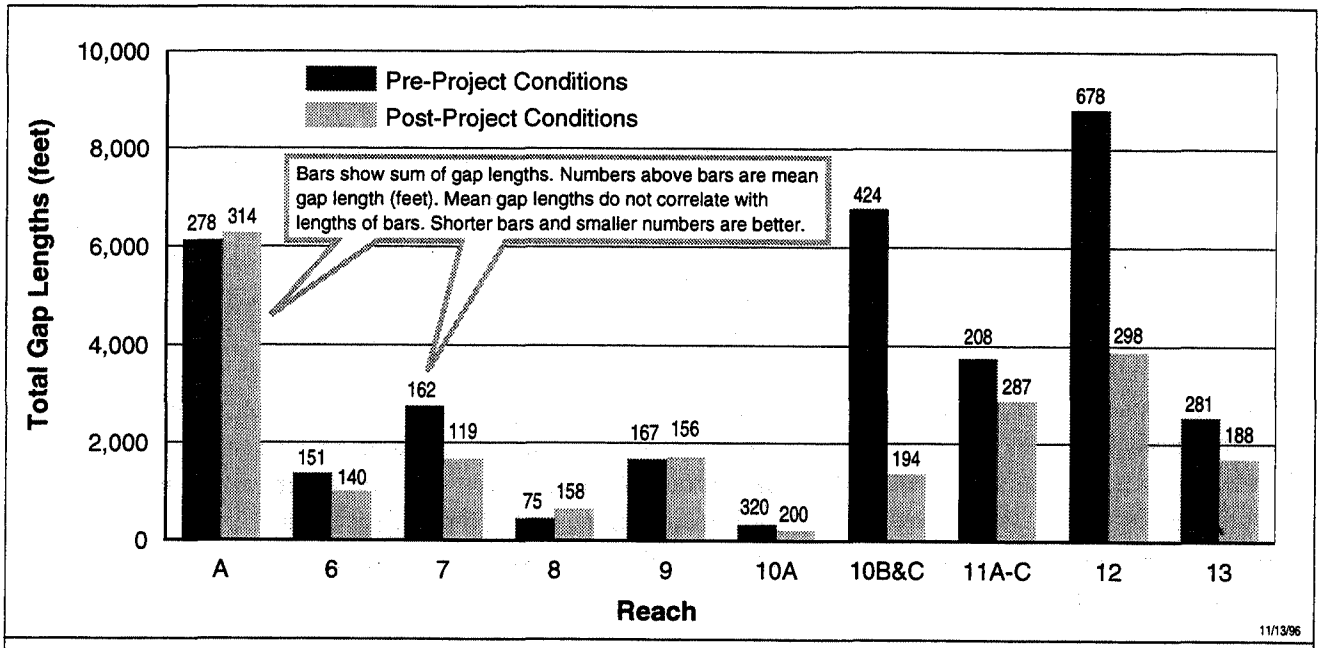


Figure 4.12-5. Pre-Project and Post-Project Gaps in Riparian Vegetation

Phasing of Project Impacts. The project would be constructed in phases, not all at once; therefore, impacts on riparian forest and other important habitats would also occur incrementally and locally, not simultaneously throughout the project area. Additionally, mitigation plantings would outpace impacts on riparian and wetland habitats early in the project. Reaches 6 and 12, which together contain 33 percent of all proposed riparian forest mitigation, but less than 3 percent of project-wide riparian forest impact, would be among the first constructed. Reach 12 also contains 75 percent of the proposed wetland mitigation acreage.

Less-than-Significant Impacts

Periodic Vegetation Removal and Disturbance for Channel Maintenance. Implementing the proposed project would result in maintaining a larger area (including bypass channels and floodway benches) than is currently subject to maintenance (see "Operational Impacts" under "Impact Mechanisms") but most of the additional area would not have native vegetation. The proposed maintenance program incorporates several measures that would protect and enhance the riparian system, including leaving the bases of native plants in place where possible to allow 10 feet of growth until the next trimming and removing non-native trees and shrubs completely to increase the ratio of native to non-native vegetation. In addition, native vegetation would no longer be cleared from river channel banks unless absolutely necessary in the course of bank erosion maintenance.

This impact is considered less than significant because the project would reduce the removal of native vegetation over preproject practices. No mitigation is required.

Potential Long-Term Decline in Riparian Forest Vigor from Removal of Adjacent Forest. Implementing the proposed project may cause declines in the cover, density, height, vigor, and native species diversity of riparian forest plants in Reaches 6-12 that would become apparent only in the long term. These changes could develop gradually over a period of years because of decreased shading, decreased soil moisture, increased air temperature, and increased wind exposure caused by removal of substantial amounts of adjacent riparian forest. Because the impact would develop slowly, the full extent and character of this impact cannot be identified without extended monitoring before and after project construction. Even with the results of such monitoring, some of the observed changes may not be clearly attributable to this project.

This impact is considered less than significant because: 1) the magnitude of the impact is expected to be substantially less than direct removal and disturbance of vegetation by construction; 2) the mechanism for this potential impact cannot be clearly defined or modeled; 3) it is not possible to predict with certainty what species would be most affected, how soon the effects would appear, how extensive the effects would be, or to what extent the ecosystem has a capacity to compensate for the impact; 4) it is not possible to predict what proportion of this impact would be attributable to the flood control project as opposed to other activities along the river; and 5) implementing other mitigation measures identified for direct impacts on riparian vegetation and shaded riverine aquatic cover would substantially minimize and offset any long-term declines in riparian forest vigor.

No mitigation is needed.

Removal of Nonforest Upland Vegetation. Implementing the proposed project would eliminate up to approximately 9.36 acres of ruderal herbaceous vegetation, 7.02 acres of ruderal scrub, and 3.81 acres of upland landscaping (Table 4.12-5).

This impact is considered less than significant because: 1) most of the vegetation affected is not native, 2) all three habitats are locally and regionally common, and 3) most areas of temporary disturbance (approximately half of the total impact) would recover naturally within a few years, and 4) some of these sites are human-caused gaps in the riparian forest and would be replanted with riparian forest in the mitigation program. The USFWS Coordination Act Report (U. S. Fish and Wildlife Service 1993) considers ruderal scrub in the project area to be important habitat for the yellow warbler, a migratory songbird, and recommends mitigation to achieve no net loss of habitat value; however, the impact on yellow warbler habitat is not considered significant under CEQA.

No mitigation is required; however, the District plans to implement other mitigation measures that should address USFWS concerns regarding impacts on yellow warbler habitat. Specifically, some areas of impact on ruderal vegetation will be replanted with riparian vegetation as part of Mitigation Measure V-1, and blackberries (ruderal scrub) and other shrubs will be planted in pockets along some stepped gabions for mitigation of visual/aesthetic impacts.

Construction Impacts

Impact V-1: Removal of Vegetation Including 9.48 Acres of Riparian Forest, 5.23 Acres of Urban Forest, 1.85 Acres of Jurisdictional Wetlands, 10.16 Acres of Other Waters of the U.S., and 250 to 300 Ordinance Trees.

Riparian Forest. Implementing the proposed project would result in direct removal of approximately 9.48 acres of existing riparian forest by construction activities, such as grading and excavation. This acreage represents approximately 20 percent of the 47.48 acres of existing riparian forest mapped in Reach A and Reaches 6-13. At least half of the loss would be in graded sites not available for on-site replacement; at least a third of the loss would be in sites that could be used for revegetation. Included in this impact would be the loss of up to 3,100 trees greater than 2 inches DBH (up to 40 percent of existing trees). Tree losses are known to be overestimated, however, because project revisions since tree surveys were conducted in 1991 have reduced the number of trees that would be removed by an estimated 5 to 15 percent. Approximately 53 percent of the trees to be removed are of species that are not native to the Guadalupe River. Approximately 33 valley oaks could be removed.

This impact is considered significant because: 1) riparian corridors support high levels of plant and wildlife diversity, 2) the ecological functions of riparian corridors are degraded by vegetation removal, and 3) much riparian vegetation has already been lost in Santa Clara Valley and throughout the San Francisco Bay region in recent decades.

Urban Forest. Implementing the proposed project would result in permanent removal of approximately 5.23 acres of urban forest in Reaches 6, 8, and 9 and Ross Creek (Table 4.12-5). Some additional backyard trees could die or become severely stressed if their root systems were disturbed by flood wall construction or other permanent impacts on Ross and Canoas creeks or the Guadalupe River. Some of the acreage included in this impact (at least 0.4 acre in Reach 6) occurs in or adjacent to construction staging areas where no removal of urban forest trees is expected to occur.

This impact is considered significant because, even though the plants are mostly non-native, many of the replacement trees would take 25 to 50 years to grow to similar size and some of these trees are protected by the City's tree ordinance.

Wetlands. Implementing the proposed project would result in permanent removal or temporary disturbance of approximately 1.85 acres of wetlands and 10.16 acres of other waters of the United States (Table 4.12-5).

A portion of the wetland impact (not quantified) would be the result of temporary disturbance or minor grading. Narrow strips of seasonal wetland affected in many such areas are expected to reestablish naturally, because natural recovery of seasonal wetland vegetation has been observed on some banks and bars on the lower Guadalupe River. Other portions of the wetland impact (particularly in Reaches A, 10B, and 12) would be permanent.

Most or all of the impacts on other waters of the United States would be temporary impacts during construction. Following construction, ordinary high waters would occupy equal or greater areas in every reach and would remain in essentially the same locations (except in the middle of Reach 10B, where the low flow channel would shift slightly eastward).

This impact is considered significant because wetlands and other waters of the United States support high levels of plant and wildlife diversity and many such areas have been lost in Santa Clara Valley and throughout the San Francisco Bay region in recent decades.

Trees Protected by City Tree Ordinance. Project construction would result in the removal of an estimated 250 to 300 trees that are large enough (over 18 inches DBH) to qualify for protection under the City's tree ordinance. The District would be required to obtain a tree removal permit and provide compensation for ordinance trees that are not on District property.

This impact is considered significant because the impact represents about 30-36 percent of existing trees in this size class and because the District must comply with the City's tree ordinance.

Impact V-2: Disturbance of Riparian Forest Adjacent to Construction Areas. Constructing the proposed project could result in substantial inadvertent injury to or mortality of riparian forest plants outside but adjacent to grading and construction areas (e.g., in lower bank sites between the channel bottom and excavated floodway benches).

Without physical barriers between construction areas and protected vegetation, impacts resulting from collisions with heavy equipment, sidecasting of graded material, soil compaction, materials storage, and other factors can be expected.

This impact is considered significant because, although the number and severity of inadvertent injuries cannot be predicted, they could affect a substantial number of trees and shrubs that would otherwise remain healthy.

Impact V-3: Disturbance of Riparian Forest Associated with Erosion Repair Activities. Bank erosion that occurred in Reaches 7 and 9 during the floods of January and March 1995 will be repaired concurrently with construction of the flood control project. The erosion sites will be repaired using a biotechnical design (with rocks of varying sizes, geotextiles, and live willow cuttings) that will allow woody riparian vegetation to establish throughout the erosion repair site. Small amounts of the "existing" riparian forest area included in pre-project habitat maps and tables has been removed already by the floods. Additional small areas could be removed or disturbed by movement of equipment and materials for the erosion repair work. The maximum combined area of flood-caused impacts and construction-caused impacts would be approximately 0.78 acre.

This impact is considered significant for the reasons described under Impact V-1.

Mitigation Measures

Plates V-41 through V-53 (in a separate volume of this EIR/EIS) show areas preliminarily designated for the mitigation plantings called for in Mitigation Measure V-1. Tables 4.12-7 and 4.12-8 summarize the existing acreage, impact acreage, and resulting post-project acreage for forests and jurisdictional waters by reach for the Preferred Project. Table 4.12-9 summarizes mitigation measures for impacts on vegetation under the Preferred Project.

Certain revegetation measures not described here are assumed to be part of the project (i.e., seeding grasses and other herbaceous plants on the floodway benches and bypass channel bottoms, planting most gabion slopes with blackberries, and seeding upland sites with grasses as needed to minimize soil erosion as required in the Storm Water Pollution Prevention Plan).

Mitigation Measure V-1: Prepare and Implement an Integrated Vegetation Mitigation Plan. The District would prepare and implement a detailed mitigation plan to compensate for removal of riparian forest, shaded riverine aquatic (SRA) cover, urban forest, City ordinance trees, and wetlands and other jurisdictional waters of the United States. All of these planting needs would be integrated into a single plan because some plantings would provide compensation for more than one impact; plantings that compensate for different impacts would be implemented side-by-side at the same time; methods of planting, maintenance, and monitoring would be similar for all types of vegetation; and scheduling of planting, maintenance, and monitoring must be coordinated for all mitigation plantings.

Table 4.12-7. Net Change in Forest Habitats for the Preferred Project and Minimize Vegetation Impact Alternative

	Riparian Forest (acres)							Urban Forest (acres)						
		Preferred Project			Minimize Vegetation Impact				Preferred Project			Minimize Vegetation Impact		
Reach	Existing	Impact	Mitigation	Change	Impact	Mitigation	Change	Existing	Impact	Mitigation	Change	Impact	Mitigation	Change
A	10.87	0.19	--	-0.19	0.19	--	-0.19	--	--	--	--	--	--	--
6	2.87	0.20	1.94	1.74	0.20	1.94	1.74	4.56	3.93	1.67	-2.26	3.93	1.67	-2.26
7	4.24	0.53	3.28	2.74	0.53	3.28	2.74	--	--	1.71	1.71	--	1.71	1.71
8	1.64	0.24	0.13	-0.11	0.39	0.13	-0.26	1.97	1.01	0.25	-0.76	1.01	0.25	-0.76
9	8.97	2.80	1.84	-0.95	0.31	--	-0.31	0.80	0.20	0.28	0.07	1.50	--	-1.50
10A	1.45	0.53	0.22	-0.31	--	--	--	--	--	--	--	--	0.22	0.22
10B	1.08	0.12	2.52	2.40	0.12	2.52	2.40	--	--	1.37	1.37	--	1.37	1.37
10C	3.54	1.44	2.79	1.35	0.43	1.04	0.61	--	--	--	--	--	--	--
11A	3.88	2.20	2.15	-0.05	1.02	--	-1.02	--	--	--	--	0.75	0.59	-0.16
11B	1.06	0.55	1.31	0.76	0.91	1.20	0.29	--	--	--	--	--	--	--
11C	2.22	0.63	0.77	0.15	0.63	0.77	0.15	--	--	--	--	--	--	--
12	2.25	0.03	6.15	6.12	0.45	1.90	1.45	--	--	--	--	--	1.52	1.52
13	3.42	0.01	1.29	1.28	0.01	1.29	1.28	--	--	--	--	--	--	--
Ross and Canoas	--	--	--	--	--	--	--	2.12	0.08	--	-0.08	0.08	--	-0.08
Total	47.48	9.48	24.40	14.91	5.21	14.08	8.87	9.45	5.23	5.28	0.05	7.27	7.32	0.05
Mitigation Goal (ratio)		2:1			2:1				1:1			1:1		
Minimum Mitigation Needed		18.97			10.41				5.23			7.27		
Extra Habitat Planned		5.43			3.67				0.05			0.05		
Total		24.40			14.08				5.28			7.32		

Summary for All Reaches	Riparian Forest (acres)		Urban Forest (acres)	
	Preferred Project	Minimize Vegetation Impact	Preferred Project	Minimize Vegetation Impact
Total Pre-Project Habitat	47.48	47.48	9.45	9.45
Total Post-Project Habitat	62.39	56.35	9.50	9.50
Net Change (increase)	14.91	8.87	0.05	0.05

Notes:

-- = zero

Impacts on riparian forest would be mitigated on a 2:1 basis (Preferred Project) replacing 9.28 acres of impact with 18.56 acres of new riparian forest.
Extra riparian forest is planned under both alternatives as a mitigation bank.
Riparian forest revegetation for erosion control sites in Reaches 7 and 9 (a total of 0.78 acre) is not included in these totals.

Impacts on urban forest are greater under the Minimize Vegetation Impact Alternative than under the Preferred Project because more residential areas are removed for bypass construction. Some revegetation areas designated for riparian forest under the Preferred Project would be planted with urban forest under the Minimize Vegetation Impact Alternative to provide the additional urban forest mitigation needed.

Plantings in bypass areas for mitigation of aesthetic impacts are not included in this table.

Table 4.12-8. Net Change in Wetland Habitats for the Preferred Project and Minimize Vegetation Impact Alternative

	Jurisdictional Wetland (acres)							Other Waters of the United States (acres)						
		Preferred Project			Minimize Vegetation Impact				Preferred Project			Minimize Vegetation Impact		
Reach	Existing	Impact	Mitigation	Change	Impact	Mitigation	Change	Existing	Impact	Mitigation	Change	Impact	Mitigation	Change
A	0.69	0.80	--	-0.80	0.80	--	-0.80	0.25	0.03	0.03	--	0.03	0.03	--
6	0.19	0.00	--	-0.00	0.00	--	-0.00	2.08	0.17	0.17	--	0.17	0.17	--
7	0.03	--	--	--	--	--	--	3.88	1.82	1.82	--	1.82	1.82	--
8	0.02	--	--	--	--	--	--	1.06	0.25	0.25	--	0.25	0.25	--
9	0.06	0.02	--	-0.02	--	--	--	4.68	1.16	1.16	--	--	--	--
10A	0.18	0.03	--	-0.03	--	--	--	1.14	0.08	0.08	--	--	--	--
10B	2.34	0.28	0.52	0.25	0.28	0.52	0.25	2.67	1.25	1.25	--	1.25	1.25	--
10C	0.08	0.04	--	-0.04	0.04	--	-0.04	2.18	0.35	0.35	--	0.35	0.35	--
11A	0.15	0.10	--	-0.10	0.08	--	-0.08	2.84	0.75	0.75	--	0.08	0.08	--
11B	0.03	--	--	--	--	--	--	0.98	0.59	0.59	--	0.59	0.59	--
11C	0.02	--	--	--	--	--	--	1.18	0.35	0.35	--	0.35	0.35	--
12	1.50	0.02	1.90	1.88	0.01	1.55	1.55	9.79	0.88	0.88	--	0.27	0.27	--
13	3.02	0.16	--	-0.16	0.16	--	-0.16	1.14	0.03	0.03	--	0.03	0.03	--
Temporary Coffer Dams		--	--	--	--	--	--	--	1.06	1.06	--	1.06	1.06	--
Ross and Canoas	0.44	0.39	--	-0.39	0.39	--	-0.39	2.75	1.41	1.41	--	1.41	1.41	--
Total	8.75	1.85	2.42	0.57	1.75	2.07	0.32	36.62	10.16	10.16	--	7.64	7.64	--
Mitigation Goal (ratio)		1:1			1:1				1:1			1:1		
Minimum Mitigation Needed		1.85			1.75				10.16			7.64		
Extra Habitat Planned		0.57			0.32				--			--		
Total		2.42			2.07				10.16			7.64		

Summary for All Reaches	Jurisdictional Wetland (acres)		Other Waters of the United States (acres)	
	Preferred Project	Minimize Vegetation Impact	Preferred Project	Minimize Vegetation Impact
Total Pre-Project Habitat	8.75	8.75	36.62	36.62
Total Post-Project Habitat	9.32	9.07	36.62	36.62
Net Change (increase)	0.57	0.32	--	--

Notes:

-- = zero

Impacts on wetlands will be mitigated on at least a 1:1 basis, replacing 1.85 acres of impact (Preferred Project) with at least 1.85 acres of new wetlands of equal or greater value. Extra wetland habitat is planned in Reach 12 to provide sufficient replacement habitat, should the primary mitigation sites be less than 100% successful, or to be designated in the future as a mitigation bank.

Impacts on other waters of the United States will be mitigated on a 1:1 basis by allowing low flows and ordinary high water to occupy the same areas after project construction that they did before project construction, or to occupy an equal or greater area along a reconfigured channel that is close to the existing channel location.

TABLE 4.12-9

SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE PREFERRED PROJECT AND THE MINIMIZE VEGETATION IMPACTS ALTERNATIVE

Impact	Preferred Project	Minimize Vegetation Impacts Alternative	Mitigation Measures
Loss of riparian forest	9.48	5.21	V-1: Prepare and implement an integrated vegtation mitigation plan and implement a public education program. V-2: Implement a vegetation protection plan for riparian and urban forests.
Loss of urban forest	5.23	7.27	V-1: Prepare and implement an integrated vegetation mitigation plan. V-2: Replace backyard trees lost because of project construction.
Loss of nonforest upland vegetation			No mitigation is required; however, the District intends to seed grasses where needed for erosion control, establish areas of upland vegetation screening, and plant blackberries (ruderal scrub) on stepped gabions to mitigate for visual and aesthetic impacts.
Ruderal herbaceous	9.36	8.38	
Ruderal scrub	7.02	6.99	
Upland landscaping	3.81	3.86	
Subtotal	20.19	19.23	
Loss of wetlands and other aquatic wildlife habitat			V-1: Prepare and implement an integrated vegetation mitigation plan.
Wetlands	1.85	1.75	
Other aquatic waters	10.16	7.64	
Subtotal	12.01	9.39	

The integrated vegetation mitigation plan would provide detailed information on planting locations (specific to each vegetation type), plant materials (e.g., species, source, and size), planting methods (e.g., site preparation and plant spacing), maintenance methods (e.g., irrigation and weed control), monitoring methods (e.g., sample design, data requirements, survey frequency, and reporting requirements), and success criteria (e.g., species composition, percent survival, and percent canopy cover).

This measure is expected to provide a net long-term increase in habitat quality along the Guadalupe River, because it would replace with native species all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants) and would also reduce the fragmentation of the riparian forest by approximately 38 percent. In addition, the project would be constructed in phases, not all at once; therefore, impacts on riparian forest and other important habitats would also occur incrementally and locally, not simultaneously throughout the project area. Additionally, mitigation plantings would outpace impacts on riparian and wetland habitats early in the project. Reaches 6 and 12, which together contain 33 percent of all proposed riparian forest mitigation, but less than 3 percent of the project-wide riparian forest impact, would be among the first constructed. Reach 12 also contains 75 percent of the proposed wetland mitigation acreage. Therefore, the lag time between loss of habitat value and full compensation would be minimized. To further minimize the lag time, a replacement ratio of 2:1 is proposed and revegetation will be performed in the first fall planting season after reach construction. A 2:1 replacement ratio was recommended by the habitat evaluation procedures (HEP) team and the USFWS in its Coordination Act Report (U.S. Fish and Wildlife Service 1993).

Goals, concepts, and guidelines that would be incorporated into the detailed mitigation plan are listed below.

Riparian Forest.

- Establish at least 18.97 acres of new riparian forest in Reaches 6-12. This goal is based on a 2:1 replacement ratio (based on canopy area) as discussed above.
- Plant tree and shrub species that are native to the local riparian system. Incorporate as much native plant material as possible into seed mixes of herbaceous plants used for erosion control.
- Plant different habitat types within riparian mitigation areas to accommodate difference in site conditions (e.g., edge of water vs. top of bank). Recommended habitat types and their dominant tree and shrub species are:

  1) Willow Riparian (arroyo willow, sandbar willow, mule fat)

  2) Cottonwood/Willow Riparian (Fremont cottonwood, arroyo willow, sandbar willow, California wild rose, California blackberry)

  3) Mixed Riparian (Fremont cottonwood, box elder, western sycamore, blue elderberry, California wild rose)

4) Sycamore/Valley Oak Riparian (western sycamore, valley oak, coast live oak, California wild rose, California blackberry)

5) Oak Riparian (coast live oak, valley oak, California wild rose, California blackberry)

- Where possible, plant riparian vegetation for mitigation in existing gaps or openings (unvegetated or ruderal herbaceous areas) to reduce fragmentation and heterogeneity in the riparian corridor.

- Use percent survival, canopy cover, stem density, and species composition of planted vegetation as success criteria for the riparian forest.

Shaded Riverine Aquatic Habitat.

- Establish at least 5,096 linear feet of new vegetative cover by planting native riparian shrubs and trees (mostly willows) along unshaded banks. This provides the 1:1 replacement ratio needed to meet the SRA requirements. SRA requirements are discussed in the Fisheries section beginning on page 4.14-39.

- Plantings intended to provide SRA cover should be planted along the water's edge at summer low flows and should be sufficiently dense to provide shade along at least 85 percent of the bank's length. At ground level, the width of plantings for riparian mitigation would vary from approximately 10 to over 30 feet because the space available for vegetation planting varies. In some areas, SRA cover would be planted on narrow strips of the low flow channel and floodway terraces that would be kept free of woody vegetation. In other areas, SRA cover would be planted where there are no constraints on planting widths. Only riparian plantings located within 15 feet of the wetted channel are considered as SRA mitigation. When mature, the widths of SRA plantings would exceed the ground level width by 10-50 feet, depending on the diameter of the canopies.

Urban Forest.

- Establish at least 5.23 acres (based on canopy area) of new sycamore-valley oak forest in selected top-of-bank sites in Reaches 6-12 to provide no net loss of urban forest.

- Use native tree species in the urban forest revegetation sites, especially western sycamore, valley oak, coast live oak, and California wild rose.

City Ordinance Trees.

- Comply with the City of San Jose's tree ordinance requirements for trees removed by the project that are not on District property.

- Consult with the City Arborist to identify and evaluate trees greater than 18 inches DBH that would be removed by the project on land not owned by the District.

Identify specific compliance and mitigation requirements when the number and value of affected trees have been determined.

- Coordinate with the City of San Jose Planning Department to determine adequate compensation for removal of ordinance trees and incorporate these trees into the mitigation plantings for riparian forest or urban forest, as appropriate. Ordinance trees are usually replaced 4:1 based on tree numbers; however, different ratios are sometimes used where circumstances warrant more or less planting. Mitigation requirements are determined on a project-by-project basis, considering the size, type, location, number, and value of the trees (Caporgno 1996).

Wetlands and Other Jurisdictional Waters of the United States.

- Establish at least 1.85 acres of constructed jurisdictional wetlands to provide no net loss of wetlands within the project area.
- Construct new wetlands in Reaches 10B and 12. Restore as much as possible of the temporarily disturbed wetlands on-site in Reach A and Reaches 6-13.
- Use native plant species such as grasses, sedges (*Carex* spp.), water-plantain (*Alisma* spp.), and knotweeds (*Polygonum* spp.) that are flexible enough to be minimally disturbed by channel maintenance activities and minimize obstruction of flood flows.
- Use jurisdictional wetland delineation criteria as a basis for success criteria for the constructed wetlands.
- Provide at least 10.16 acres of constructed and restored other waters to provide no net loss of other waters that are either disturbed or eliminated during project construction.

Locations.

- Locate all mitigation plantings in Reaches 6-13 and begin implementation of mitigation plantings in Reach 12 in the early years of the multi-phase construction.
- Where sites can be revegetated following construction disturbance or minor grading, implement mitigation directly on the sites that were disturbed. Implement the remaining mitigation plantings in appropriate locations that are currently unvegetated or occupied by ruderal vegetation or sparse, degraded riparian forest.
- Plates V-41 through V-53 (in a separate volume) show anticipated locations of mitigation planting sites for riparian forest, urban forest, and wetlands. More detailed specifications of planting locations are to be included in the detailed mitigation plan.

Success Criteria. Criteria for success of the mitigation plantings would be based on density of live woody plants per acre and plant species diversity during the initial 5-year establishment period. Specific criteria for tree and shrub densities would vary with the type of riparian community. Generally, plant survival exceeding 85 percent in the first year and 45 percent after 5 years would be reasonably expected to reestablish the habitat lost.

Revegetation sites would be required to contain all the native species initially planted (although relative amounts may change) after 5 years.

Maintenance and Monitoring.

- Provide maintenance that would protect mitigation plantings and facilitate establishment of vigorous vegetation.
- Monitor the mitigation plantings in a manner that provides early feedback to the District and its revegetation contractors on methods to improve results or correct problems, allows a determination of when success criteria have been achieved, and provides the documentation needed for monitoring required under CEQA and by project permits.
- Follow the mitigation monitoring guidelines of the Corps (1991) for standards of wetland monitoring design and reporting. Riparian and wetland plantings should be monitored for at least 5 years, including at least 2 years after the removal of irrigation systems.

Public Education Program. As part of the integrated vegetation mitigation plan, the District would prepare and implement a program to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project and to solicit their cooperation and support. Principal actions would include:

- Developing an educational brochure on proper stream care to be distributed to homeowners along the Guadalupe River within the environs of the project area before construction begins. This brochure would explain: 1) the reasons for the removal of non-native vegetation, 2) the values of native vegetation along the riparian corridor and on private property, 3) reasons for not dumping debris, 4) related issues concerning water quality, and 5) guidelines for aesthetic improvement.
- Conducting a series of workshops for creekside homeowners before and after project construction to explain the riparian mitigation program to be implemented, the value of riparian habitat to wildlife, and the goals of the mitigation program.

The program would be coordinated with Mitigation Measure V-1 and the District's channel maintenance program for the Guadalupe River.

Mitigation Measure V-2: Implement a Vegetation Protection Plan for Riparian and Urban Forests. The District would prepare and implement a plan to protect vegetation that does not need to be removed during project construction from inadvertent damage. This plan would incorporate standard construction practices used by the District and described in the project description.

Before construction begins, a survey would be conducted to identify and flag locations of construction area boundaries, specific trees near or within construction areas that are to be saved, and selected trees that may be transplanted to a mitigation area. Orange plastic barricade fencing would be erected or similar measures taken along construction area

boundaries to identify areas of protected vegetation. The fencing would be placed as close to the actual limit of grading or construction (i.e., as far from the forest edge) as possible. If practical, selected trees within construction areas may be transplanted for use in a designated mitigation area by an experienced tree-moving contractor.

During construction, attachment of ropes, cables, or guys to trees outside the construction area would be avoided, except in emergencies. Trees not designated for removal that are damaged during construction would be trimmed under the direction of a qualified arborist to minimize the risk of disease. Trees outside the construction area that are damaged beyond recovery would be replaced at a minimum 3:1 basis with additional native trees in a designated riparian forest mitigation area or shaded riverine aquatic habitat cover mitigation area.

The District would replace or compensate property owners for any native or non-native backyard trees that die or become severely stressed as a result of flood wall construction or other construction-related activities. Replacement may be provided on a 1:1 in-kind basis for trees with drip lines within 10 feet of project construction that die or become severely stressed during construction, or within 1 year after completion of construction for trees that are determined by a qualified arborist, on a case-by-case basis, to have been affected by project construction.

Mitigation Measure V-3: Revegetate Erosion Repair Sites With Riparian Vegetation. The District would incorporate live willow cuttings and other plant materials into the erosion repair treatments as specified in the maintenance program included in Appendix C, and would revegetate all areas cleared for access to the erosion repair sites with native riparian vegetation. This mitigation measure is similar to the riparian mitigation called for in Mitigation Measure V-1; however, the replacement ratio for erosion repair sites is 1:1 (not 2:1 as in Mitigation Measure V-1). The mitigation goal for the erosion repair sites is 1:1 because the initial impact resulted from natural causes (flooding), the proposed repair methods would allow for on-site recovery of riparian vegetation, and the sites would be less susceptible to erosion after the repairs are completed.

Residual Impacts After Mitigation

Potential impacts to vegetation resources could be mitigated to a level of insignificance by successful implementation of the mitigation measures recommended in this section of the EIR. Successful implementation of mitigation measures would provide a net long-term increase in habitat quality along the Guadalupe River because all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants) would be replaced with native species, many existing gaps in the riparian corridor would be filled, and a net gain of riparian forest and possibly wetland acreages would result. Educating the community and creekside homeowners about biological mitigation and habitat protection associated with the project would increase the likelihood of successful mitigation efforts.

The proposed construction phasing (Table 3.5, Chapter 3 of this EIR/EIS) has been designed to allow for mitigation planting in Reach 12 and construction of flood control facilities in

Reach A and Reach 6 as the first phase of the project. The major portion of riparian vegetation impacts would result from construction of flood control facilities in the middle reaches, which would be phased between 1999 and 2017. This phasing would allow time for mitigation planting to become established and for habitat to become available in Reach 12 prior to construction impacts occurring in other reaches of the Upper Guadalupe River Corridor.

Minimize Vegetation Impacts Alternative

Impacts of the Minimize Vegetation Impacts Alternative would be similar to those of the proposed project but they would affect smaller acreages in Reaches 9-10A and Reaches 10C-11A. Levels of significance, mitigation measures, and replacement ratios would be the same for impacts on vegetation under the Minimize Vegetation Impacts Alternative and the Preferred Project.

Table 4.12-10 presents impacts of the Minimize Vegetation Impacts Alternative on vegetation. Figure 4.12-6 illustrates impacts on sensitive vegetation types for this alternative. Tables 4.12-7 and 4.12-8 summarize the existing acreage, impact acreage, estimated mitigation acreage, and resulting post-project acreage for forests and jurisdictional waters by reach for both alternatives. Table 4.12-9 summarizes mitigation measures for impacts on vegetation under the Minimize Vegetation Impacts Alternative and Preferred Project.

Some impacts cannot be predicted and therefore cannot be compared quantitatively between the Minimize Vegetation Impacts Alternative and the Preferred Project, including:

- disturbance of riparian forest adjacent to construction areas,
- periodic vegetation removal and disturbance for floodway maintenance, and
- potential long-term decline in riparian forest vigor from removal of adjacent forest.

These impacts would be similar in character to those for the Preferred Project, but would affect a smaller area under the Minimize Vegetation Impacts Alternative.

Losses of vegetation that can be quantified by acreage are compared for the Preferred Project and the Minimize Vegetation Impacts Alternative in Tables 4.12-7 and 4.12-8. These impacts include:

- removal of riparian forest,
- removal of urban forest,
- removal of nonforest upland vegetation, and
- loss or disturbance of jurisdictional waters of the United States.

Mitigation measures for the Minimize Vegetation Impacts Alternative would be the same as those for the Preferred Project, except that mitigation acreages would be reduced in proportion to the reduction in impacted acreage.

Table 4.12-10. Impacts of the Minimize Vegetation Impact Alternative on Vegetation

	Riparian and Upland Habitats					Jurisdictional Waters	
Reach	Riparian Forest	Urban Forest	Ruderal Scrub	Ruderal Herbaceous	Upland Landscaping	Wetlands	Other Waters
A	0.19	--	1.84	1.10	1.70	0.80	0.03
6	0.20	3.93	0.05	0.08	0.24	0.002	0.17
7	0.53	--	0.58	0.02	--	--	1.82
8	**0.39**	1.01	--	--	--	--	0.25
9	**0.31**	**1.5**	--	--	--	--	--
10A	--	--	--	--	--	--	--
10B	0.123	--	0.83	2.29	0.86	0.28	1.25
10C	**0.43**	--	0.61	0.33	0.28	0.04	0.35
11A	**1.02**	**0.75**	**0.23**	**0.96**	--	**0.08**	**0.08**
11B	**0.91**	--	0.84	0.11	0.66	--	0.59
11C	0.63	--	0.08	0.66	--	--	0.35
12	**0.45**	--	**1.86**	0.28	0.12	0.01	0.27
13	0.01	--	0.07	--	--	0.16	0.03
Temporary Coffer Dams	--	--	--	--	--	--	1.06
Canoas	--	--	--	--	--	--	--
Ross	--	0.08	--	2.55	--	0.39	1.41
Guadalupe River Subtotal	5.21	7.19	6.99	5.83	3.86	1.36	6.23
Tributaries Subtotal	--	0.08	--	2.55	--	0.39	1.41
Project Total	**5.21**	**7.27**	**6.99**	**8.38**	**3.86**	**1.75**	**7.64**

Notes:

Numbers in bold differ from those in the Preferred Project. Brief explanations of differences follow:

Reach 8: Impacts on riparian vegetation would be approximately 0.15 acre greater than under the Preferred Project because of the additional bypass outlet below Willow Glen Way.

Reach 9: Impacts on urban forest would be greater than under the Preferred Project because the bypass channel passes through approximately 90 residential properties.

Reach 10A: All impacts on vegetation would be avoided under the MVI Alternative.

Reach 10C: Impacts on riparian vegetation would be less than under the Preferred Project.

Reach 11A: Impacts on urban forest would be greater because more residences would be removed; however, all other impacts on vegetation would be less than under the Preferred Project.

Reach 11B: Impacts on riparian vegetation would be approximately 0.3 acre greater than under the Preferred Project because of the additional bypass entrance between Wellington Square and Bryan Avenue. All other impacts would be the same as under the Preferred Project.

Reach 12: Impacts on riparian vegetation and ruderal scrub would be slightly greater than under the Preferred Project because of grading associated with the bypass entrance and exit.

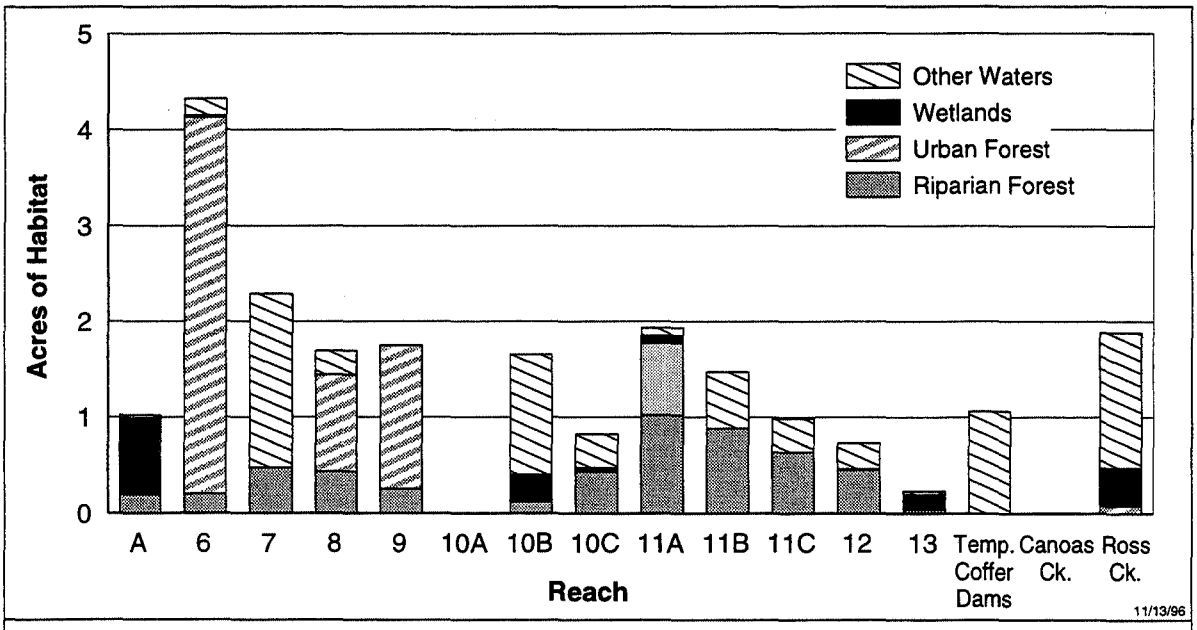


Figure 4.12-6. Impacts of the Minimize Vegetation Impact Alternative on Forests and Jurisdictional Waters

No-Project Alternative

No construction impacts on vegetation would occur under the No-Project Alternative; however, long-term benefits resulting from the proposed mitigation plan (a net gain of riparian forest and possibly wetland acreages, reduction of gaps in the riparian corridor and reduction of non-native plants in the riparian forest) would not occur. Existing and ongoing operations and maintenance and erosion control practices that were described under "Operational Impacts" would continue.

4.13 WILDLIFE

Affected Environment/Setting

Methods (Data Collection)

Systematic wildlife surveys were conducted from January 1986 to January 1987 on Reaches 6, 7, and 9-12 of the Guadalupe River (Appendices W-A, W-AA, and W-B). The year-long monitoring study did not include surveys of Reach A, Reach 8, Ross Creek, or Canoas Creek. Reach A was omitted from 1986 and 1987 surveys because it was not part of the project in 1986. Ross and Canoas creeks were omitted because they lack riparian habitat (the focus of the study). Reach 8 was omitted because of limitations of access, but representative sample plots were established immediately downstream and upstream of this reach (Appendices W-A and W-AA).

Qualitative surveys and observations of wildlife use and habitat values along Reaches 6-12 were also performed in 1986 and 1987. Reconnaissance-level surveys of wildlife resources in Reaches 6-12, Reach A, Ross Creek, Canoas Creek, and Guadalupe Creek were also performed in November and December 1989 and in January, April, May, and June 1990 (Appendices W-A and W-AA). Jones & Stokes Associates' wildlife biologists also conducted reconnaissance-level surveys throughout the project area in March and October 1992. A complete discussion of the methods and results of these studies is presented in Appendices W-A, W-AA, and W-C.

Birds were counted twice each month for one year at 49 census plots (Appendix W-A). The resulting information was used to assess wildlife habitat quality and provide baseline data for an analysis of potential impacts on each river reach and habitat type. Survey plots were classified by reach and by the size and cover of dominant vegetation according to the classification system of the California Department of Fish and Game (DFG) Wildlife Habitat Relationships (WHR) program (Appendices W-A and W-B).

Trapping of small mammals was attempted in areas where mammal sign or activity had been observed or where mammals were suspected to exist. Trapping was conducted on 560 trap-nights. Mammal activity and signs observed during the avian census periods were also recorded.

Recording of reptiles and amphibians was based on observations made during the avian sampling program, specific searches of suitable habitat, and trapping with drift nets and funnel traps. Eight sample areas were selected for reptile- and amphibian-trapping efforts, and trapping continued for 16 trap-nights (Appendix W-A).

Additional data on wildlife use of the project area and vicinity were gathered from literature reviews and consultation with people familiar with the wildlife resources of the area. Dr. L.R. Mewaldt provided notes and results from bird censuses conducted in Reach A by a San Jose State University field studies course.

Wildlife surveys focusing on burrowing owls, other birds, and southwestern pond turtles were conducted along Reaches A and 12 on June 20 and 27, and July 6 and 13, 1995. Habitat suitability for the California red-legged frog was also evaluated during the 1995 surveys. DFG requested that additional surveys be conducted, to comply with DFG's burrowing owl guidelines.

The Habitat Restoration Group and BioSystems Analysis conducted a Habitat Evaluation Procedures (HEP) analysis in 1991 and prepared the HEP report that was used for portions of the impact assessment and mitigation planning. The evaluation species used in the HEP analysis were the northern oriole, Pacific-slope flycatcher, rufous-sided towhee, belted kingfisher, yellow warbler, and downy woodpecker.

A Habitat Evaluation Procedures Conference with participating resource agencies (CDFG, USFWS, and Corps) was conducted in January 1993. The purpose of this meeting was to review the District terrestrial riparian Habitat Evaluation Procedure (HEP) for the project. The HEP recommended a 0.8:1 mitigation ratio. The USFWS recommended a 2:1 ratio be used to compensate for the loss of riparian habitat. This mitigation ratio has been used in this EIR/EIS and is the basis for the mitigation plan outlined in the biotic resources analyses.

Special-Status Wildlife Species

Special-status species are animals that are legally protected under state and federal Endangered Species Acts or other regulations, and species that are considered sufficiently rare by the scientific community to qualify for such listing. Special-status wildlife species are in the following categories:

- animals listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (50 CFR 17.11 [listed animals] and various notices in the Federal Register [proposed species]);
- animals that are candidates for possible future listing as threatened or endangered under the federal Endangered Species Act (60 Federal Register 40, February 28, 1996);
- migratory nongame birds of management concern by the U.S. Fish and Wildlife Service;
- Federal species of concern (informal U.S. Fish and Wildlife Service Designation);
- animals that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines, Section 15380);
- animals listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (14 CCR 670.5);
- animal species of special concern to the California Department of Fish and Game (Remsen 1978 [birds] and Williams 1986 [mammals]);

- animals fully protected in California (Cal. Fish and Game Code, Section 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians]); and
- animals listed as sensitive by the local U.S. Forest Service region (Forest Service Manual 2670) or U.S. Bureau of Land Management resource area.

Regional Setting

Santa Clara County has a diversity of habitats and a correspondingly diverse vertebrate community. DFG's WHR database predicts that 211 species of birds, 60 species of mammals, and 43 species of reptiles and amphibians (314 total species) are regularly found within the County. Many additional bird species are found on an occasional basis.

Riparian habitats in the west, including those of the Santa Clara Valley, support a rich array of wildlife species. The majority of species regularly found in the valley depend on or use riparian habitats. At least 133 species of birds, 51 species of mammals, and 34 species of reptiles and amphibians are expected to be found in riparian habitats of the Santa Clara Valley. Based on these estimates, 218 (69 percent) of the wildlife species predicted by WHR to occur regularly in Santa Clara County use riparian habitats.

The riparian habitats in the Santa Clara Valley provide water, cover, food, and breeding areas to make them one of the most important habitats found in the valley. Densities of birds in riparian habitats can be more than 10 times those in adjacent habitats (Stevens et al. 1977). Additionally, Gaines (1977) reported that 43 percent of all California bird species reach their maximum densities in riparian habitats in the Central Valley.

Local Setting

Ranching, agriculture, residential and industrial development, and other activities associated with urbanization have eliminated most of the riparian habitat in the Santa Clara Valley. Thus, the riparian vegetation along the Guadalupe River constitutes one of the last remaining significant areas of this habitat in the region. Other notable areas of riparian habitat in the valley occur along portions of Coyote, Llagas, Uvas, Los Gatos, and Stevens creeks.

The project area contains a mosaic of habitats, ranging from dense, mature cottonwood forest to open herbaceous vegetation along disturbed channels. In a few sections of the project area, mature, multiple-layer riparian plant communities are present, dominated by combinations of cottonwood, willow, sycamore, box elder, walnut, and other trees. Most of the riparian corridor along the Guadalupe River is narrow and discontinuous, and constrained by adjacent land uses.

The lands surrounding the River have been developed into residential, commercial, and light industrial areas. Numerous roads (including two highways and an expressway) and two railways cross the River in the project area, creating breaks in the riparian corridor and limiting some wildlife movement (especially that of terrestrial species such as mammals, reptiles, and some amphibians) along the River. Past bank stabilization actions have created additional gaps in the riparian corridor. The extent of riparian habitat growing on the banks of the River is limited by residences, roadways, and other structures that are at or near the top

of the banks, and by previous bank stabilization and flood control activities. The relative lack of natural or rural areas adjacent to the riparian corridor and its narrow width may limit its attractiveness to wildlife, and species with large home range requirements may be absent.

Despite its narrow, fragmented character and urban setting, the Guadalupe River is an important area for wildlife in the Santa Clara Valley because:

- it provides an important refuge for wildlife in an urban environment;
- it supports species, such as yellow warblers, that do not occur in adjacent habitats;
- it provides a corridor (connecting San Francisco Bay, the valley floor, and foothill habitats) for movement of wildlife, such as small mammals, amphibians, and resident birds;
- it functions as a linear reserve, adding to the total amount of suitable habitat in the local environment; and
- it makes an important contribution to maintaining a wide range of wildlife species in adjacent habitats, including urban areas.

Wildlife Habitat Types

Freshwater Marsh and Aquatic Habitat. The wildlife value of the freshwater marsh and aquatic habitat is reduced by a variety of factors, including urban pollution, habitat fragmentation, and habitat loss. The narrowness of the River limits the suitability of this habitat for species that prefer large areas of open water. The Guadalupe River, however, has seasonal in-stream percolation ponds and adjacent ponds that provide important open water habitat for wildlife. Freshwater marshes are limited in extent and distribution in the project area and, thus, provide limited habitat for marsh wildlife. Wildlife species known or expected to exist in marsh and aquatic habitats include the western toad, bullfrog, Pacific treefrog, western aquatic garter snake, great blue heron, great egret, green-backed heron, black-crowned night-heron, mallard, belted kingfisher, and black phoebe. Two or three pairs of belted kingfishers probably nest in the project area, with suitable nesting habitat existing in Reaches 7, 8, 9, and 11 and adjacent to Reach 12.

Riparian Forest. Riparian habitats are considered to be among the most productive habitats for wildlife in California, and riparian forests support the most dense and diverse wildlife communities in the Santa Clara Valley. Riparian habitats often contain special ecological features that are not found in upland areas (Brinson et al. 1981). The availability of water, diversity and abundance of plant life, and complex vegetation structure provide a variety of wildlife species with food, cover, breeding, and resting sites. Richness and abundance of wildlife species is generally greater in riparian habitats than in adjacent habitats because of the juxtaposition of aquatic and terrestrial habitats and the high proportion of habitat edge. Habitat edges, the areas where different vegetation types meet, generally receive high levels of wildlife use. Additionally, riparian corridors function as important passages for wildlife movement (Thomas et al. 1979). This habitat type is of special concern in California because of its high wildlife value and limited distribution.

Disturbed areas along the Guadalupe River are dominated by the black locust (a non-native tree). In general, non-native trees have lower value to riparian wildlife than native trees, and their abundance along the Guadalupe River reduces the habitat values in the project area. Wildlife use of non-native plants in the vicinity of the project area is discussed in Appendix W-D.

Habitat fragmentation, isolation, and habitat degradation (caused by urbanization, introduction of non-native plant species, and human disturbance) have substantially reduced the wildlife value of riparian habitats along the Guadalupe River. All wildlife species with large home ranges and using large, contiguous areas (e.g., coyotes, gray fox, and bobcats) have been eliminated from the project area. Wildlife species that use the riparian corridor are tolerant of human activity and urbanization, require small home ranges, or are able to move from one habitat area to another.

The riparian habitat supports abundant aquatic and terrestrial invertebrates that are prey for amphibians, reptiles, small mammals, and insectivorous birds. However, urban streams, such as the Guadalupe River, support few amphibian and reptile species because habitat values have been reduced by urbanization and by construction and maintenance of flood control facilities and maintenance in Santa Clara Valley and San Jose. The Pacific treefrog, western toad, and bullfrog are common amphibians along the Guadalupe River.

Reaches 6, 7, 8, 9, 10A, 10C, and 11 provide high-quality riparian habitat for birds. Bird species using these riparian forests include mourning doves, downy woodpeckers, Nuttall's woodpeckers, red-shouldered hawks, Pacific-slope flycatchers, chestnut-backed chickadees, and northern orioles. However, few bird species nest along the Guadalupe River because the riparian vegetation corridor is narrow, the understory vegetation is absent or occurs in localized areas, and natural habitats adjacent to the River are absent.

Reaches A and 12 have low to marginal wildlife habitat value because these consist primarily of bare ground and a small amount of non-native trees and shrubs and ruderal vegetation.

Mammals known or expected to exist in the riparian habitat include the Virginia opossum, raccoon, Trowbridge shrew, broad-footed mole, fox squirrel, Botta's pocket gopher, and feral cat.

Ruderal Herbaceous. Ruderal herbaceous habitats support fewer wildlife species than adjacent habitats, such as wetland, riparian, and urban forest habitats. The sparse vegetation in ruderal habitats provides cover and foraging habitat for common wildlife species that exist in the project area. These species include the western fence lizard, southern alligator lizard, gopher snake, California ground squirrel, mourning dove, northern mockingbird, white-crowned sparrow, house finch, and lesser goldfinch. Some riparian wildlife species also forage in ruderal habitats.

Ruderal Scrub. Wildlife species composition and habitat use are similar in ruderal scrub habitat to those described in the ruderal herbaceous habitat section above.

Upland Landscaping. Upland landscaped areas dominated by non-native plants are generally less productive for wildlife using the project area than are wildlife habitats dominated by native plant species. Landscaped areas support fewer wildlife species than adjacent habitats, such as wetlands and riparian forests. Wildlife species that exist in the landscaped areas include Pacific treefrogs, western fence lizards, gopher snakes, Anna's hummingbirds, yellow-rumped warblers, house finches, chestnut-backed chickadees, ruby-crowned kinglets, and house sparrows.

Urban Forest. Most wildlife species using urban forests in the project area are common residents or migrants that remain for short periods. Areas with large trees and understory plantings of shrubs are the most productive for wildlife. Wildlife habitat values are the highest where native trees (e.g., oaks and sycamores) are present. Human activity, domestic pets, automobile traffic, urban pollutants, and paved areas limit the value of the project area for wildlife. Urban forests also function as buffers for natural areas, such as riparian habitats. Wildlife species that use urban forests in the project area include the western toad, Pacific treefrog, western fence lizard, American robin, northern mockingbird, scrub jay, cedar waxwing, California towhee, and fox squirrel.

Unvegetated Areas. Unvegetated areas are considered low-quality habitats for wildlife because they lack cover and offer limited foraging habitat. Several wildlife species exist in open habitats; these include the California ground squirrel, western fence lizard, killdeer, mourning dove, burrowing owl, and American kestrel.

Wildlife Habitats and Conditions by Reach

The following description of the wildlife resources and condition of the wildlife habitat types in each portion of the project area is based on data collected in surveys conducted during 1986-1992. Plates V-1 through V-20 (in a separate volume) show the locations of the existing habitats in each reach.

Reach A: Highway 101 to Interstate 880. Based on the WHR program, Reach A could support 146 species of vertebrate wildlife, including 37 species of nesting birds. The number of species in this reach is somewhat greater than average for the project area, but the number of nesting bird species is below average. Reach A was not included in the yearlong wildlife monitoring study because it was not part of the District's plans for the flood control project in 1986-1987. At the request of DFG, wildlife surveys were conducted in June and July 1995.

Riparian forest is sparse throughout this reach. The riparian vegetation has been disturbed by flood control modifications and other activities, and is bordered on both banks by heavily traveled roads, an airport, and parking lots. The extensive ruderal habitat and the discontinuous nature of the riparian canopy limits the suitability of this reach for riparian wildlife species. Much of the vegetation along Reach A is non-native landscaped plants. It is, however, attractive to wildlife species that use ruderal and open habitats, and dense growth of coyote brush on both banks provides cover for many species and nesting substrate for some birds. Common wildlife species observed along Reach A include the house finch, song sparrow, white-crowned sparrow, lesser goldfinch, California towhee, black phoebe, cliff swallow, California ground squirrel, raccoon, and western fence lizard.

The mature cottonwoods and stands of willows attract some riparian wildlife species, such as the northern oriole, downy woodpecker, warbling vireo, and red-shouldered hawk. However, many riparian wildlife species, particularly neotropical migrant breeding birds, may be present in only small numbers in Reach A. A pair of red-shouldered hawks may nest in this reach; however, none were seen during 1995 surveys.

The open tree canopy and numerous gravel bars along Reach A provide suitable foraging habitat for wading birds, shorebirds, and other water birds, such as great blue herons, great egrets, common snipe, spotted sandpipers, greater yellowlegs, mallards, and common moorhen. Streamside emergent vegetation provides limited cover and forage, but is not extensive enough to support substantial use by marsh-dependent wildlife species.

Reach 6: Interstate 280 to Southern Pacific Railroad Tracks. A total of 50 bird species were recorded in four census plots during the year-long monitoring study (Appendix W-AA). This reach is similar in wildlife species composition to Reaches 7, 8, and 9, discussed below.

The wildlife habitat value of Reach 6 is high because of the nearly continuous canopy of native riparian trees (e.g., Fremont cottonwoods, black walnuts, and willows) along the lower and midbank zones, and the grove of eucalyptus downstream of Virginia Street.

The eucalyptus grove on the east bank and the California pepper trees on the west bank of the river provide good winter cover and foraging resources for insect-gleaning birds such as the bushtit, ruby-crowned kinglet, and yellow-rumped warbler. Flowers of the eucalyptus and berries of pepper trees provide food for orioles, western tanagers, cedar waxwings, American robins, and hummingbirds.

Although the riparian corridor is narrow in Reach 6, the habitat values are high for some wildlife because of the presence of large trees in the residential neighborhood to the east (particularly downstream of Virginia Street). The cottonwoods, willows, and walnuts in this reach support a wide variety of wildlife species, including most of the riparian-dependent species that occur in the project area. Many of the older trees in or near the corridor have dead tops or branches, supporting substantial numbers of woodpeckers. However, for much of the reach, the urban forest trees are separated from the corridor by McLellan Avenue. Other factors limiting the wildlife value of Reach 6 include resident dogs, a human encampment, and a proliferation of invasive non-native understory plant species. Bullfrogs are numerous in this reach, reducing its value for native amphibians.

Reach 7: Southern Pacific Railroad Tracks to Union Pacific Railroad Tracks. A total of 65 bird species were recorded in 10 census plots in this reach, which is similar in wildlife species composition to Reaches 6, 8, and 9.

The wildlife habitat values and resources of Reach 7 are similar to those described for Reach 6. Niches for a wide variety of species are provided by the relatively continuous riparian canopy, dominated by native Fremont cottonwoods, box elders, black walnuts, willows, and black locusts, and good understory development. Factors reducing the wildlife value of Reach 7 include the presence of barren land in the light rail transit right-of-way and the drainage channel adjacent to the east bank, and the proximity of Highway 87, which crosses

the reach near its downstream end. Trees in the backyards of the neighborhood adjacent to the west bank functionally add to the width of the corridor for some wildlife species, especially birds.

The bird species noted for cottonwood habitats in Reach 6 also occur in Reach 7. Belted kingfishers are commonly seen in Reach 7 and raptors were also observed in relatively high numbers in the yearlong monitoring study; raptors include nesting and foraging red-tailed hawks and red-shouldered hawks and foraging black-shouldered kites, Cooper's hawks, and sharp-shinned hawks. These birds were probably attracted by the numerous mammals and the presence (until 1986-1987) of open land provided by an abandoned golf course and orchard east of the corridor. However, the habitat value of the reach declined for raptors when the abandoned golf course and orchard were removed for construction of Highway 87, a light rail transit station, and a drainage channel.

Small mammals (mice, rats, moles, gophers, and squirrels) were found to be relatively common in Reach 7 during the yearlong wildlife monitoring study.

Reach 8: Union Pacific Railroad Tracks to Willow Glen Way. Reach 8 potentially supports 119-135 species of wildlife, including 30-41 species of nesting birds, and is similar in wildlife species composition to Reaches 6, 7, and 9. This reach was not included in the year-long wildlife monitoring study because of limited access.

The riparian corridor is narrow (50-100 feet wide) throughout this reach, but the canopy is continuous along the east bank and mostly continuous along the west bank. Wildlife habitat is dominated by dense stands of mature Fremont cottonwood, box elder, blue elderberry, black walnut, and willow. Wildlife use of Reach 8 appears to be affected by the proximity of houses and yards that border the upper bank on both sides of the river. Backyard trees add to the usable width of the corridor for some species (especially birds), and serve as a buffer for the riparian trees. However, activities associated with residential development, such as dumping of debris, thinning of tree canopies, and the presence of cats and dogs, reduce the wildlife habitat value. The lining of sacked-concrete on the west bank also reduces wildlife use of this reach. Understory vegetation is thinly distributed throughout most of Reach 8, and absence of substantial groundcover or shrub layers limit its use by species that prefer these habitats, such as song sparrows, rufous-sided towhees, and hermit and Swainson's thrushes.

Reach 9: Willow Glen Way to Curtner Avenue. Along with Reach 11, Reach 9 probably supports the greatest diversity of breeding birds, and generally has the highest value for riparian wildlife of any portion of the project area. A total of 58 bird species were recorded in five census plots in this reach; wildlife species composition for Reach 9 is similar to that of Reaches 6, 7, and 8.

The dense riparian canopy, comprised of cottonwoods, box elders, black walnuts, blue elderberries, and sycamores, and the typically dense growth of understory plants support use by a wide variety of species. Although portions of Reach 9 have stands of mature cottonwoods, these areas are narrow and patchy, and most areas are dominated by black walnut and other trees or shrubs. Cottonwood trees provide perching sites for predatory

birds, nest sites for cavity- and foliage-nesting species, and foraging areas for foliage-gleaning and fly-catching species. A red-shouldered hawk nest was observed near the end of Pine Street. Nearly all the avian species observed in this reach are also found in portions of the previous reaches with cottonwood groves. Stands of black locust occur in portions of the reach, but they offer lower wildlife habitat values than native trees.

Wildlife use of Reach 9 is apparently influenced by the noise and heavy traffic of Almaden Road, which borders the east bank for approximately two thirds of the reach. Because of the disturbance caused by traffic, portions of the reach immediately adjacent to this road probably receive reduced levels of use by sensitive wildlife species. In contrast, the west side is bordered by older residential areas with numerous tall trees, possibly increasing the usable habitat area for some species. Large sections of the east bank in this reach are covered with concrete rubble or sacked-concrete slope protection. One census plot in a cottonwood stand with rip-rap in place of understory vegetation was found to support far fewer individuals and species of birds than census plots in cottonwood stands with a vegetated understory. Additionally, several homeowners on the west bank have extended their gardens and lawns out onto the lower terrace of the river (in the vicinity of Willow Glen Way), reducing the value of the understory habitat in those areas.

Reach 10: Curtner Avenue to Capitol Expressway. A total of 67 bird species were recorded in 12 census plots along this reach. Overall, the wildlife habitat value of Reach 10 is moderate to high because of the interrupted canopy of native riparian trees. However, the canopy is sparse and the vegetation is narrow in some areas, lowering the value for wildlife. Wildlife use of Reach 10, as a whole, is adversely affected by major thoroughfares that cross the riparian habitat throughout most of the reach.

Because of its length, Reach 10 was divided into three subreaches, each with distinct habitat conditions.

Reach 10A: Curtner Avenue to Canoas Creek. Reach 10A contains a narrow (40- to 200-feet wide) riparian corridor of native trees dominated by cottonwoods, sycamores, and box elders, mixed with non-native black locusts and Lombardy poplars. The habitat of this subreach resembles that of Reach 9, except it is narrower and Almaden Road is more heavily traveled along this reach. Wildlife using Reach 10A may be buffered somewhat from traffic-related disturbance by the east bank of the river, which drops steeply from the edge of the road. The overstory canopy in this subreach ranges from dense to sparse. The trees provide cover and foraging and nesting substrate for warblers, woodpeckers, and other land birds. Overall, the wildlife value of the riparian habitat is low where stands of black locust, rather than native trees, are dominant (refer to Appendix W-D). A patch of giant reed on the west bank was used as a roost by black-crowned night-herons during the 1986 wildlife monitoring study (the only heron roost site found in the project area), but no herons were present during surveys in 1989, 1990, and 1992.

Reach 10B: Canoas Creek to Stream Gage Station No. 23B. The banks of Reach 10B have been altered by bank clearing and placement of stepped gabions. Most of the riparian forest has been removed from this reach. Beginning at Almaden Expressway (southbound) adjacent to Canoas Creek, the habitat becomes more open and the trees are widely spaced,

with minimal understory vegetation. The soil is highly compacted, leaving it impenetrable to many burrowing mammals and, apparently, making seedling establishment difficult. This compacted soil is present south to the upstream end of the subreach. A recently revegetated area planted on a bench on the east bank (the Lincoln Properties mitigation site) currently functions as ruderal scrub habitat for wildlife. Because the revegetation was marginally successful, this portion of the bench does not provide habitat value for riparian wildlife species. However, the area has been planted with coast live oak, valley oak, western sycamore, and buckeye, and should support high levels of wildlife use when the trees reach maturity. Avian species found throughout Reach 10B are those typical of residential areas and parks, including bushtits, northern mockingbirds, and a variety of sparrows and finches, while the more typically riparian wildlife species were limited to the small, less disturbed areas.

Reach 10C: Stream Gage Station No. 23B to Capitol Expressway. Reach 10C includes groves of large, old sycamores and a mixture of deciduous trees and shrubs. This subreach has relatively high value for wildlife, attributable to the sycamore trees. The wildlife value of the area is also enhanced by the presence of an abandoned orchard on the east bank, at the downstream end of the reach. Acorn woodpecker, black-shouldered kite, barn owl, and American kestrel were observed in this area during the wild-life monitoring study. A pair of American kestrels nested in a dead branch of a sycamore.

Reach 11: Capitol Expressway to Branham Lane. A total of 71 bird species were recorded in 10 census plots on Reach 11 during the study. Similar to Reach 9, Reach 11 has generally high wildlife habitat value, due in part to the presence of coast live oaks and valley oaks, both of which are more common in Reach 11 than elsewhere in the project area. The oaks in and adjacent to the corridor represent significant wildlife resources and support the largest populations of oak-associated wildlife in the project area, such as the plain titmouse, Hutton's vireo, white-breasted nuthatch, acorn woodpecker, and Nuttall's woodpecker. Portions of Reach 11 have substantial brush cover and mature, tall trees that are important for cavity-nesting species and animals foraging for insects.

Reach 11 is divided into three subreaches, although the habitat conditions in each subreach are less distinctive than in Reach 10. Consequently, the wildlife habitat values are fairly similar between subreaches, but are highest at the upstream end of Reach 11B and the downstream end of Reach 11C (Ross Creek confluence). The subreaches are discussed below.

Reach 11A: Capitol Expressway to San Jose Water Company Property. Reach 11A supports a moderately dense canopy comprised of native black walnuts, coast live oaks, and scattered valley oaks and western sycamores, with intervening patches of non-native ruderal scrub and grassy borders. This subreach has moderate value for wildlife. The sycamores and oaks are high-value trees, but the patchiness of the tree coverage in this reach reduces its overall value for wildlife.

Reach 11B: San Jose Water Company Property to Ross Creek. Reach 11B supports a discontinuous canopy and intervening patches of ruderal habitat. Along the east bank, the canopy is mostly continuous and well developed and is dominated by the non-native black

locust. Black walnut and western sycamore trees are also common along this reach. The west bank supports a discontinuous canopy. The large eucalyptus grove on the west bank has wildlife habitat values similar to those of the grove in Reach 6. The understory in Reach 11B is largely grassy or dominated by blackberry bushes.

Almaden Expressway borders the top of the west bank, significantly limiting wildlife use of that side of the reach. The city park and wellfield adjacent to the east bank and upstream of Bryan Avenue enhance the wildlife value of Reach 11B, providing open space and numerous oaks and tall eucalyptus. An abandoned red-tailed hawk nest is located in these eucalyptus, indicating suitability of this area for nesting raptors.

Reach 11C: Ross Creek to Branham Lane. Reach 11C is located between a residential neighborhood to the east and light industrial development to the west. The wildlife habitat value of Reach 11C is higher than that of Reach 11B because of a fairly continuous canopy of non-native trees (e.g., black locust) and native trees (e.g., black walnut, cottonwood, and western sycamore), but the value is reduced by the dominance of black locust (see Appendix W-D).

Reach 12: Branham Lane to Blossom Hill Road. A total of 65 bird species were recorded in six census plots along this reach during the study. Reach 12 has low value for riparian wildlife because of the dominance of ruderal vegetation.

Reach 12 has very few trees and two in-stream, seasonal percolation ponds. A large agricultural field is west of the project area, and three large percolation ponds are adjacent to the project area along both banks of the River in the upper half of the reach. Highway 85, under construction during 1989-1991, crosses over the upper third of the reach. Reach 12 is frequently used by pedestrians (e.g., joggers and individuals walking dogs), bicyclists, and fishers. Wildlife use of this reach corresponds to the major habitat features in or adjacent to the reach. Some species use the tall, solitary tree groups in open areas; some species use the open fields and vegetation of the corridor for cover; and some species use the shallow or deep water habitat and its associated edge.

Reach 12 supports a wide variety of species that use ruderal habitat, some of which (e.g., sparrows) are present in large numbers. Trees and large shrubs occur in patches within Reach 12; no areas have continuous canopy cover. The scattered sycamores have high wildlife habitat value because of their large size, natural cavities, and dead branches, which can be used for roosting or nesting. A pair of burrowing owls was resident on the banks of the River in the upper portion of the reach during the monitoring study, but none were observed during the 1995 burrowing owl surveys.

The agricultural field adjacent to Reach 12 attracts foraging flocks of blackbirds, starlings, and doves in greater concentrations than elsewhere in the project area. Raptors are also regularly present in the area, attracted by the open habitat of the field and the percolation ponds.

The proximity of the three large percolation ponds significantly affects the species composition of wildlife using Reach 12 and vicinity. Eighteen species of waterbirds that may

use the reach are expected only at the in-stream percolation ponds. Several additional species of water birds are attracted to the three percolation ponds adjacent to this reach but are unlikely to use the river corridor itself. The in-stream percolation ponds are used by foraging egrets, herons, ducks, kingfishers, and terns but, in general, these ponds attract only small numbers of water birds, possibly because of the lack of wetland vegetation.

The aquatic habitat of the ponds and the stream channel elsewhere in the reach is suitable breeding habitat for western toad and Pacific treefrog, but the value of this habitat is limited for these and other aquatic species by the absence of emergent vegetation. The largest number of individual reptiles and amphibians were observed within this reach during the yearlong wildlife monitoring study. Western fence lizards and western toads were sighted on many occasions.

Ross Creek: Almaden Expressway to 700 Feet Upstream of Jarvis Avenue. The portion of Ross Creek in the project area potentially supports 79-84 species of wildlife, including 17-19 species of nesting birds. This reach was not included in the yearlong wildlife monitoring study because the study focused on riparian habitat of the Guadalupe River corridor.

Riparian habitat is absent in this reach, contributing to its very low wildlife habitat value. Most of the wildlife species that use Ross Creek are those occurring commonly in residential areas, and the aquatic habitat is the most significant wildlife resource in the reach. Common snipe were numerous along Ross Creek during the winter 1989-1990 surveys, and other water birds, such as belted kingfisher and green-backed heron, were also found there. Wildlife use of this reach is enhanced somewhat by the presence of trees in adjacent backyards.

Canoas Creek: Almaden Expressway to End of Nightingale Drive. The portion of Canoas Creek in the project area potentially supports 89-93 species of wildlife, including 20-24 species of nesting birds. This reach was not included in the yearlong wildlife monitoring study because the study focused on riparian habitat of the Guadalupe River corridor.

Riparian habitat is virtually lacking in this reach, greatly limiting its value to wildlife in the area. Many of the species known or expected to occur are those that occur commonly in the surrounding residential areas. Wildlife use of this reach is enhanced somewhat by the presence of trees in adjacent backyards but, in the absence of shrub and tree growth on the banks and levee tops, the overall wildlife habitat value is low.

The aquatic habitat of the stream and stream edge is the most significant wildlife resource in this reach, attracting small numbers of herons, egrets, kingfishers, and common snipe. These species are more numerous upstream of Nightingale Drive. The wildlife habitat value of the stream is decreasing significantly as IBM reduces pumping groundwater into Canoas Creek as part of its groundwater cleanup program.

Special-Status Wildlife

Special-status wildlife species known to occur or with the potential to occur in the project area are listed in Table 4.13-1, along with their habitat requirements and geographic distributions, known occurrences in the region, and reasons for decline or concern.

Table 4.13-1. Special-Status Wildlife Species That are Known to Occur or Could Occur along the Guadalupe River

Species Common/ Scientific Names	Legal Status[a] Federal/State	Distribution in California	Habitat Requirements	Occurrence in Project Area
San Francisco forktail damselfly (*Ischnura gemina*)	SC/--	Point Reyes peninsula, San Francisco, South Bay, East Bay to Berkeley	Small shallow ponds, slow streams, marshes, canals, and permanent water sources with sparse emergent vegetation	No records; potential habitat exists along Guadalupe River where emergent vegetation exists
Edgewood blind harvestman (*Calicina minor*)	SC/--	Santa Clara and San Mateo Counties	Moist, serpentine grasslands	No records; no suitable habitat
Ricksecker's water scavenger beetle (*Hydrochara ricksecker*i)	SC/--	Greater San Francisco Bay area; reported from Marin, San Francisco, and San Mateo Counties	Slow-moving streams, ponds, permanent water	No records; unlikely to occur along Guadalupe River
California red-legged frog (*Rana aurorac draytoni*)	T/SSC	West of the Sierra-Cascade crest and along the Coast Ranges, usually below 4,000 feet	Quiet pools of streams, marshes, and ponds	No records; potential habitat exists, but the habitat is degraded by urbanization; unlikely to occur; none observed
Foothill yellow-legged frog (*Rana boylei*)	SC/SSC	Coast Ranges, western slope of the Sierra-Cascade foothills up to 6,000 feet	Streams with sunny, sandy, or rocky banks with shallow riffles	No records; potential habitat exists, but is degraded by urbanization; unlikely to occur; none observed
Southwestern pond turtle (*Clemmys marmorata pallida*)	SC/SSC	South of San Francisco Bay and west of San Joaquin Valley	Ponds, small lakes, streams, and marshes with rocks and logs for sunning	No records; marginal-quality foraging habitat; no breeding habitat; none observed through 1995
Double-crested cormorant (*Phalacrocorax auritus*)	--/SSC	Nests along the coast, rivers, and lakes of California	Nests in snags or cliffs; forages in ponds, lakes, streams, bays, and coastal waters	No breeding records; aerial transient
Osprey (*Pandion haliaetus*)	--/SSC	Nests along the coast and major rivers of California	Rivers, bays, lakes, and coastal areas for foraging; large trees near lakes, rivers, and coastal areas	No breeding records; aerial transient
Black-shouldered kite (*Elanus caeruleus*)	--/FP	Central Valley and coastal valleys of California	Nests in riparian habitats near agricultural fields, grasslands, and wetlands	No nesting records; rare fall and winter visitor in areas near open fields
Sharp-shinned hawk (*Accipiter striatus*)	--/SSC	Coniferous forests and woodlands throughout California	Nests in coniferous forests; winters in forests and woodlands	Uncommon migrant and winter visitor; outside known breeding range
Cooper's hawk (*Accipiter cooperii*)	--/SSC	Coniferous forests and woodlands throughout California	Nests in riparian forests, oak woodlands, and coniferous forests; winters in woodlands and forests	No nesting records; uncommon migrant and winter visitor
Merlin (*Falco columbarius*)	--/SSC	Winters throughout California	Forages in grasslands, savannas, and wetlands	Rare migrant and winter visitor
Peregrine falcon (*Falco peregrinus*)	E/E	Nests in cliff habitats throughout California	Nests on cliffs; forages in open habitats, including wetlands and grasslands	Rare migrant and winter visitor

Table 4.13-1. Continued

Species Common/ Scientific Names	Legal Status[a] Federal/State	Distribution in California	Habitat Requirements	Occurrence in Project Area
California gull (*Larus californicus*)	--/SSC	Winters throughout California; breeds in Great Basin lakes	Forages in wetlands, fields, and shallow water	Common aerial visitor
Western burrowing owl (*Speotyto canicularia hypugea*)	SC, MNBMC/SSC	Lowlands throughout California	Nests in California groundsquirrel burrows; forages in agricultural fields, abandoned fields, and grasslands	Rare resident in Reach 12; rare resident or visitor in Reach A; may have abandoned project area; none were seen in Reaches A and 12 during 19956 field surveys
Black swift (*Cypseloides niger*)	--/SSC	Isolated areas throughout California	Nests in cliffs behind waterfall	Rare aerial visitor
Willow flycatcher (*Empidonax traillii*)	SC/T	Isolated areas in montane California	Nests in mountain meadows with willow clumps and riparian scrub habitats	Rare migrant
Yellow warbler (*Dendroica petechia*)	--/SSC	Throughout California	Riparian scrub and forest habitats	Uncommon nester in Reaches 6-9 and 11
Yellow-breasted chat (*Incteria virens*)	--/SSC	Throughout California	Riparian forest with perennial or nearly perennial water	Rare migrant

[a] Status explanations:

Federal

E = listed as endangered under the federal Endangered Species Act.

T = listed as threatened under the federal Endangered Species Act.

C = candidate for federal listing. Candidates include species for which USFWS has some biological information indicating that listing may be appropriate but for which further biological research and field study are usually needed to clarify the most appropriate status.

MNBMC = migratory nongame bird of management concern.

SC = federal species of concern (informal USFWS designation).

State

E = listed as endangered under the California Endangered Species Act.

T = listed as threatened under the California Endangered Species Act.

FP = fully protected under the California Fish and Game Code.

SSC = species of special concern.

The burrowing owl and yellow warbler were observed in the project area during the field surveys in 1986 and 1987, but no burrowing owls were seen in 1995. Because of increasing human activity, it is unlikely that burrowing owls still occur in the study area. Potential habitat exists along the Guadalupe River for the San Francisco forktail damselfly and Ricksecker's water scavenger beetle.

Potential habitat exists in the project area for several special-status wildlife species, but their presence is unlikely because existing habitats are degraded by human activity. These species include the California red-legged frog, foothill yellow-legged frog, western pond turtle, least Bell's vireo, yellow-breasted chat, and tricolored blackbird (Table 4.13-1).

The California red-legged frog was petitioned for federal listing as a threatened or endangered species on January 15, 1992. On July 19, 1993, the U.S. Fish and Wildlife Service (USFWS) announced that the listing of the California red-legged frog was warranted and that USFWS would publish a proposed regulation to list the frog as a threatened or endangered species. On May 23, 1996, the USFWS identified the California red-legged frog as a threatened species. No red-legged frogs were seen during all the previous wildlife surveys for other species.

The western pond turtle was petitioned for federal listing on January 15, 1992. The petition included the northwestern and southwestern subspecies of the pond turtle. The project area is within the range of the southwestern subspecies of the pond turtle. On August 11, 1993, USFWS announced that the listing of the western pond turtle did not meet the definition of an endangered or a threatened species at that time. The petition could be revised and resubmitted in the future. No southwestern pond turtles were seen during the previous surveys, including the 1995 surveys.

Suitable habitat does not exist in the project area for the edgewood blind harvestman and bank swallow (Table 4.13-1). Several special-status wildlife species could occur in the project area as transients or rare migrants, including the double-crested cormorant, osprey, black-shouldered kite, sharp-shinned hawk, Cooper's hawk, merlin, peregrine falcon, California gull, black swift, and willow flycatcher. Species for which habitat exists in the project area are discussed below.

Burrowing Owl. The burrowing owl was historically common throughout lowland California. However, a decline first noticed in the 1940s has continued to the present (Grinnell and Miller 1944, Remsen 1978, DeSante 1992). In the San Francisco Bay Area and central portion of the Central Valley (Yolo County south to Merced County), the burrowing owl population has declined by 65 percent since 1986 (DeSante 1992). The population has declined primarily because of pesticide use, rodent control programs, and habitat loss or degradation (Remsen 1978).

Burrowing owls occur throughout the lowlands of California. They breed and roost in burrows, especially California ground squirrel burrows. Burrowing owls often nest in roadside embankments, on levees, and along irrigation canals. They prefer open, dry, nearly level grassland or prairie habitat (Grinnell and Miller 1944). These owls use burrows during

the breeding season (February-September) for nesting and during the nonbreeding season (October-January) for cover.

The owls' nesting behavior makes them vulnerable to being hit by cars (especially fledglings), disturbed during road and levee maintenance operations, and generally harassed by domestic pets and pedestrians (Remsen 1978).

Reaches 12 and A provide potential low-quality habitat for breeding and wintering burrowing owls, and a pair of burrowing owls were resident along the banks of the Guadalupe River in the upper portion of Reach 12 during the 1986 and 1987 monitoring surveys. Burrowing owls were an irregular visitor in Reach A. No burrowing owls were observed during the four surveys in 1995. Because of continued human disturbance, it is unlikely that burrowing owls will return to Reaches 12 and A.

Yellow Warbler. The yellow warbler was once a common nesting bird throughout California, but the species has declined with the loss of riparian habitat and presence of nest parasitism by the brown-headed cowbird (Remsen 1978). Yellow warblers nest in riparian forest and riparian scrub habitats, placing their nests in shrubs and low trees.

Portions of the Guadalupe River are considered suitable breeding habitat for the yellow warbler, which were found nesting in the cottonwood forests along Reaches 6, 7, 8, 9, 10A, 10C, and 11.

San Francisco Forktail Damselfly. The San Francisco forktail damselfly (forktail) occurs in small shallow ponds, marshes, and human-made channels in the greater San Francisco Bay area (e.g., Marin County south to Santa Cruz County) (Natural Diversity Data Base 1993). Very little is known about the distribution and habitat requirements of the forktail. Forktails prefer slow-moving or ponded water with sparse or no emergent vegetation (Hafernik 1993). Streams and ponds degraded by runoff from urbanized areas do not appear to adversely affect the forktail (Hafernik 1993). Forktails inhabit natural streams and streams altered for flood control. This species has been recorded in eight locations in the Bay Area.

Suitable habitat for forktails is common along the Guadalupe River. Some flood control activities (e.g., maintaining shallow, open water) may provide suitable habitat for forktails along the River. There are no records of forktails along the Guadalupe River, but they probably occurred there historically. The nearest known location of the forktail is along Coyote Creek in the San Jose area, approximately 3 miles north of the Guadalupe River (Hafernik 1993).

Ricksecker's Water Scavenger Beetle. The distribution of Ricksecker's water scavenger beetle appears to be restricted to the greater San Francisco Bay area. Two locations of this beetle were reported in the Natural Diversity Data Base (NDDB): Bolinas, Marin County, and near San Bruno, San Francisco County (Natural Diversity Data Base 1993). This species was also found in San Mateo County (Hafernik 1993). Ricksecker's water scavenger beetle is a scavenger with aquatic larvae that are predators. Very little is known about the life history, distribution, and habitat requirements of the this species (Hafernik 1993).

Although the Guadalupe River could be within the beetle's range, it is unlikely that this species occurs in the project area (Hafernik 1993). Potential Ricksecker's water scavenging beetle habit is not expected to occur within the project area, and implementation of the project is not likely to adversely impact this species.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Impacts on wildlife were considered significant if the project would result in any of the following:

- Substantial loss of wildlife habitat or disruption of natural movement corridors or fragmentation or isolation of riparian habitats;
- Substantial disturbance or displacement of wildlife from recreation and human activities;
- Direct mortality, habitat loss, or lowered reproductive success for individuals of state or federally listed wildlife species;
- Direct mortality, habitat loss, or lowered reproductive success for substantial portions of local populations of candidate species for state or federal listing or California species of special concern;
- Long-term or permanent disturbance or displacement by recreation and human activities for substantial portions of local populations of candidates for state or federal listing or California species of special concern; or
- Cumulative impacts on wildlife of two or more individual effects that, when considered together, are substantial.

Impacts were considered less than significant if they would not meet any of the criteria identified above. Beneficial impacts include changes that would result in net increases in the extent or quality of native riparian, wetland, or upland wildlife habitats. If substantial effects would occur, beneficial impacts were identified as significant.

Construction Impacts

Construction impacts would result from removal of riparian and upland vegetation, disturbance of wildlife during construction, and direct mortality from construction.

The following assumptions were made regarding construction-related impacts on wildlife habitat.

- All existing wildlife habitat would be lost, at least temporarily, in areas that are graded. Riparian forest, urban forest, and other wildlife habitat types would be affected. Wildlife using these areas would be displaced or destroyed during construction, and their natural movement corridors would be disrupted.

- Wildlife using habitats adjacent to grading and construction areas could be temporarily or permanently displaced during construction.
- Some existing waters of the United States, including wetlands, would be filled, and additional areas would be cleared or excavated by grading, which would displace or destroy wetland-dependent wildlife.
- Impacts on state or federally listed threatened or endangered wildlife species could occur in the project area.
- Impacts on other special-status wildlife (e.g., burrowing owl and yellow warbler) could occur in upland, riparian habitats, and wetland areas.

Operational Impacts

Operational impacts could result from changes in maintenance activities associated with the project. These impacts could result from periodic vegetation removal or trimming that is more extensive than at present.

The following assumption was made regarding operational impacts on wildlife.

- Vegetation that could provide wildlife habitat in the floodway would continue to be cleared periodically to maintain capacity for flood conveyance. This clearing would occur over a smaller area than at present.

Preferred Project

Acreages of impacts are summarized for each habitat by reach in Table 4.12-5 and illustrated in Figure 4.12-4 (see the "Vegetation" chapter). Plates V-21 through V-40 (in a separate volume) show impact areas overlain on existing habitats.

Less-than-Significant Impacts

Removal of Nonforest Wildlife Habitat. Implementing the project would eliminate approximately 9.36 acres of ruderal herbaceous habitat, 7.02 acres of ruderal scrub habitat, and 3.81 acres of upland landscaping (Tables 4.12-5 and 4.13-2 and Plates V-21 through V-40, in a separate volume). Ruderal habitats, especially along Reach A, provide important habitat for adjacent riparian wildlife, foraging habitat for raptors, and a buffer between the riparian corridor and adjacent developed areas. Approximately half of this loss is temporary; the habitat would recover naturally in a few years. Some areas of impact on ruderal habitats would be planted with riparian vegetation as part of Mitigation Measure V-1, which requires establishing new riparian vegetation to compensate for riparian forest removed in construction (refer to Section 4.12, "Vegetation"). Because approximately half of the impacted upland habitats would recover in a few years and these upland habitats do not support special-status wildlife species, this impact is considered less than significant.

No mitigation is required; however, the District plans to implement other mitigation measures that should address USFWS concerns regarding impacts on yellow warbler habitat.

TABLE 4.13-2

SUMMARY OF IMPACTS AND MITIGATION MEASURES FOR THE PREFERRED PROJECT AND THE MINIMIZE VEGETATION IMPACTS ALTERNATIVE

Impact	Preferred Project	Minimize Vegetation Impacts Alternative	Mitigation Measures
Loss of riparian forest	9.48	5.21	V-1: Prepare and implement an integrated vegtation mitigation plan and implement a public education program. V-2: Implement a vegetation protection plan for riparian and urban forests.
Loss of urban forest	5.23	7.27	V-1: Prepare and implement an integrated vegetation mitigation plan. V-2: Replace backyard trees lost because of project construction.
Loss of nonforest upland vegetation			No mitigation is required; however, the District intends to seed grasses where needed for erosion control, establish areas of upland vegetation screening, and plant blackberries (ruderal scrub) on stepped gabions to mitigate for visual and aesthetic impacts.
Ruderal herbaceous	9.36	8.38	
Ruderal scrub	7.02	6.99	
Upland landscaping	3.81	3.86	
Subtotal	20.19	19.23	
Loss of wetlands and other aquatic wildlife habitat			V-1: Prepare and implement an integrated vegetation mitigation plan.
Wetlands	1.85	1.75	
Other aquatic waters	10.16	7.64	
Subtotal	12.01	9.39	

Specifically, some areas of impact on ruderal vegetation would be replanted with riparian vegetation as part of Mitigation Measure V-1, and blackberries (ruderal scrub) and other shrubs would be planted in pockets along some stepped gabions for mitigation of visual/aesthetic impacts.

Periodic Disturbance and Removal of Wildlife Habitat for Floodway Maintenance. Implementing the proposed maintenance program would result in the periodic removal of riparian wildlife habitat in the channel bottom and lower banks. The proposed maintenance program incorporates several measures that would minimize impacts on wildlife and enhance riparian wildlife habitat, including, where possible, leaving the bases of native plants in place to allow several feet of growth until the next trimming, and removing non-native trees and shrubs to increase the ratio of native to non-native vegetation, which would increase the habitat value for wildlife.

This impact is considered less than significant because the proposed project would reduce the extent of clearing of vegetation from preproject practices.

No mitigation is required; however, implementing Mitigation Measures V-2 and V-3, a public education program and a vegetation protection plan for riparian and urban forests, respectively, would reduce the potential of inadvertent impacts on wildlife habitat.

Construction Impacts

Impact WL-1: Removal of Riparian Wildlife Habitat. The HEP team (i.e., representatives from USFWS, DFG, the District, and Jones & Stokes Associates) for the Guadalupe River Flood Control Project agreed that the field surveys and the HEP analysis prepared by The Habitat Restoration Group and BioSystems Analysis were adequate to characterize the habitat requirements of riparian wildlife, including the evaluation species, and assess the impacts on the evaluation species.

The HEP analysis of the riparian wildlife resources of the proposed project was designed to:

- Describe the existing riparian wildlife habitat conditions for selected evaluation species in the proposed project area and mitigation sites;
- Determine the baseline riparian wildlife habitat values for the evaluation species in the proposed project area and mitigation sites;
- Quantify impacts on riparian wildlife habitat from implementation and operation of the proposed project;
- Determine whether the proposed compensation mitigation plan would fully offset direct, on-site, project-related impacts on riparian wildlife habitat for the evaluation species; and
- Develop management actions for mitigation sites in the proposed project area.

Implementing the proposed project would result in removal of 9.48 acres of riparian wildlife habitat (e.g., riparian forest) from construction activities such as grading and excavation. Losses of riparian habitat are presented by reach in Table 4.12-5 and summarized in Table 4.13-2. The loss of riparian habitat would eliminate or displace wildlife species that occupy riparian habitat at the project site. The HEP analysis determined that the evaluation species least affected by project implementation would be the rufous-sided towhee and also determined that the northern oriole would be the most affected evaluation species.

This impact is considered significant because riparian forest, which provides important habitat for riparian-dependent wildlife, has declined locally (Santa Clara Valley), regionally (Central Coast), and statewide, and the proposed project would contribute to this decline.

Impact WL-2: Fragmentation of Wildlife Habitat Along the Riparian Corridor. Implementing the project would increase wildlife habitat fragmentation along the Guadalupe River corridor by removing riparian vegetation in each reach of the river (Tables 4.12-5 and 4.13-2). Wildlife habitat fragmentation and isolation is the process of creating disjunct patches of one kind of vegetation or habitat surrounded by vegetation of different kinds or by urbanization. The faunas of these "habitat islands" generally contain fewer species than do those of the adjacent larger tracts of equivalent habitat or former habitat (Terborgh and Winter 1980, Jensen et al. 1990). The additional loss of riparian vegetation along Reaches 9 and 10A would increase fragmentation by reducing riparian forest stand size from greater than 1 acre to less than 1 acre. The smaller stands would be unable to support many of the breeding bird species that currently occur in these reaches, such as yellow warblers. Increased habitat fragmentation would substantially reduce the wildlife value of Reaches 9 and 10A; therefore, this impact is considered significant for these reaches.

Impact WL-3: Disturbance of Riparian Wildlife Habitat Adjacent to Construction Areas. Constructing the proposed project could result in substantial loss of riparian wildlife habitat outside, but adjacent to, grading and construction areas. The loss of adjacent riparian wildlife habitat is considered significant because of the local, regional, and statewide decline of riparian habitats.

Impact WL-4: Removal of Urban Forest Wildlife Habitat. Implementing the proposed project would result in removal of approximately 5.23 acres of urban forest wildlife habitats in Reaches 6, 8, and 9 and on Ross Creek (Tables 4.12-5 and 4.13-2). Additional backyard trees could die or become severely stressed if their root systems were disturbed by flood wall construction or other actions affecting Ross and Canoas creeks or the Guadalupe River. The loss of this buffer would substantially reduce the habitat values of the adjacent riparian forest. Many animals, especially birds, that use the riparian corridor move out to forage in adjacent upland habitats, including urban forests.

This impact is considered significant because the loss of urban forest would eliminate habitat that provides a buffer and foraging habitat for wildlife that use the adjacent riparian corridor.

Impact WL-5: Removal of Wetland and Aquatic Wildlife Habitats. Implementing the proposed project would result in the permanent removal or temporary disturbance of approximately 1.85 acres of wetland and 10.16 acres of other waters of the United States

(Tables 4.12-5 and 4.13-2). The original vegetation, functions and values of these habitats may reestablish naturally in areas of temporary disturbance, but not in areas of permanent removal caused by excavation or filling (see Impact V-1 in the "Vegetation" section.) This impact is considered significant because wetland and aquatic wildlife habitats have high value for wildlife and have declined substantially in Santa Clara Valley, the central Coast Ranges region, and the state.

Impact WL-6: Construction Disturbance to Wildlife Species along the Guadalupe River. Construction-related noise and activity could disturb foraging, breeding, and roosting wildlife along the Guadalupe River. This impact is considered significant because of the high use of the Guadalupe River by water birds for foraging and roosting and because construction activity could disturb substantial numbers of breeding or roosting wildlife along the River.

Impact WL-7: Loss of Yellow Warbler Breeding Habitat. Implementing the proposed project would eliminate some suitable yellow warbler nesting and foraging habitat along Reaches 6, 7, 8, 9, 10A, 10B, 11A, 11B, and 11C. This impact is considered significant because DFG includes the yellow warbler on its list of species of special concern and the project could eliminate a substantial amount of occupied breeding habitat, resulting in a substantial decline of breeding yellow warblers along the Guadalupe River.

Impact WL-8: Potential Disturbance to Breeding Burrowing Owls. Implementing the proposed project could result in the disturbance (e.g., from grading and construction activities) of potentially breeding burrowing owls in Reach 12 and in Reach A. This impact could be temporary or permanent. This impact is considered significant because DFG includes the burrowing owl on its list of species of special concern and the proposed project could contribute to the decline of the species locally and regionally.

Impact WL-9: Loss of Suitable San Francisco Forktail Damselfly Habitat. Implementing the proposed project, primarily excavation, could result in the loss of approximately 12.01 acres of suitable San Francisco forktail damselfly habitat along Guadalupe River. This impact is considered potentially significant because the forktail is currently rare in the project area, and a substantial amount of forktail habitat could be affected by the project.

Mitigation Measures

Mitigation Measure WL-1: Compensate for the Loss of Riparian Wildlife Habitat by Implementing Mitigation Measures V-1 and V-2 (refer to Section 4.12, "Vegetation"). These mitigation measures recommend that the District implement an integrated vegetation mitigation plan, a public education program, and a vegetation protection plan for riparian and urban forests. A habitat replacement ratio of 2:1 is proposed to mitigate for construction and operational impacts of the proposed project on riparian habitat (Neudorf 1993). As described in the "Vegetation" chapter, these measures are expected to result in a long-term gain in riparian habitat quality because of the use of native species for mitigation plantings would outpace impacts on riparian and wetland habitats.

Mitigation Measure WL-2: Implement Mitigation Measures V-1 and V-2 to Compensate for Increased Wildlife Habitat Fragmentation. These mitigation measures recommend that the District implement an integrated vegetation mitigation plan, a public education program, and a vegetation protection plan for riparian and urban forests. The District would establish at least 18.97 acres of new riparian forest. The amount of 18.99 acres is based on a proposed 2:1 replacement ratio (based on canopy area), as recommended by the HEP team. Implementing the proposed mitigation measures would reduce the fragmentation of the riparian forest by approximately 38 percent, increase the total amount of riparian forest by at least 20 percent compared to pre-project conditions, and increase the ratio of native to non-native trees and shrubs.

Mitigation Measure WL-3: Minimize Loss of Adjacent Riparian Wildlife Habitat V-2. This mitigation measure recommends that the District prepare and implement a plan to protect vegetation that does not need to be removed during project construction.

Mitigation Measure WL-4: Implement Mitigation Measures V-1, V-2, and V-3 to Reduce the Impact of Loss of Urban Forest Wildlife Habitat. Mitigation Measure V-1 recommends that the District prepare and implement a detailed mitigation plan to compensate for removal of urban forest and other vegetation. Mitigation Measure V-2 recommends that the District prepare and implement a program to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project. Mitigation Measure V-3 recommends that the District implement a vegetation protection plan for riparian and urban forests. Mitigation Measure V-4 recommends that the District replace or compensate property owners for backyard trees that die or become severely stressed as a result of project-related activities.

Mitigation Measure WL-5: Compensate for the Loss of Wetland and Aquatic Habitats by Implementing Mitigation Measure V-1. Mitigation Measure V-1 provides for creation of habitat for wetland-dependent wildlife.

Mitigation Measure WL-6: Implement Mitigation Measure V-2 to Minimize Construction-Related Disturbances of Wildlife. This measure designates boundaries of construction zones that need to be fenced or flagged to protect wildlife habitat and compensation for inadvertent loss of trees.

Mitigation Measure WL-7: Implement Mitigation Measures V-1 and V-2 to Compensate for the Loss of Yellow Warbler Habitat. These mitigation measures recommend that the District implement an integrated vegetation mitigation plan, a public education program, and a vegetation protection plan for riparian and urban forests.

Mitigation Measure WL-8: Conduct Burrowing Owl Survey and Avoid Adverse Impacts on Burrowing Owls if Present. The District should conduct burrowing owl surveys in Reach 12 and Reach A during the nonbreeding season (September-January) and no more than 2 weeks before construction begins to determine whether burrowing owls are occupying the project site before construction. Within 30 days of conducting the survey(s), the District should submit results to DFG. If no burrowing owls exist at the project site, no additional mitigation measures would be required.

If survey results reveal the presence of owls, monitoring by a qualified wildlife biologist would be required during construction activities and the District would provide a letter report of monitoring activities to DFG.

If surveys determine that burrowing owls are present, the District should implement one of the following mitigation measures, depending on when construction is scheduled to occur.

- If construction occurs during the nonbreeding season (September-January), the District would avoid construction within 160 feet of the active burrow to avoid disturbing or killing the burrowing owls. This schedule would comply with laws under the California Fish and Game Code, the federal Migratory Bird Treaty Act, and DFG's borrowing owl guidelines. Monitoring potential wintering burrows would be necessary to ensure that no owls were killed during grading. A qualified wildlife biologist would survey the affected area within 2 weeks before construction activity begins to determine if active burrows are present. After determining that active burrows are unoccupied, the burrows should be destroyed to prevent reoccupancy during construction.

- If construction occurs during the breeding season (February-August), the District would exclude the owls from the project area before the breeding season began and prevent the owls from returning by the following actions:

  - Examining all potential burrows in Reach 12 and Reach A during the nonbreeding season (September-January) to determine the presence or absence of owls,

  - Destroying or collapsing unoccupied burrows to prevent their use during the nonbreeding and breeding seasons, and

  - Monitoring the project site and continuing to destroy burrows until grading begins to ensure that new burrows constructed by ground squirrels are not occupied by owls and used as dens.

- If no other options are available, relocate burrowing owls. The District would prepare a relocation and habitat protection plan in coordination with DFG and USFWS and obtain permits from both DFG and USFWS.

  Within 60 days of completion of construction activities in Reach 12 and in Reach A, the District would submit a letter report to DFG that includes results of the preconstruction survey, monitoring and preventive actions taken during construction, and postconstruction conditions.

  Successful implementation of this mitigation measure would reduce this impact to a less-than-significant level.

Mitigation Measure WL-9: Compensate for the Loss of Forktail Habitat by Implementing Mitigation Measure V-1. Mitigation Measure V-1 provides habitat for wetland-dependent wildlife (refer to Section 4.12, "Vegetation").

Residual Impacts After Mitigation

Potential impacts to wildlife resources could be mitigated to a level of insignificance by successful implementation of the mitigation measures recommended in this section of the EIR/EIS. Successful implementation of mitigation measures would provide a net long-term increase in habitat quality along the Guadalupe River because all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants) would be replaced with native species and a net gain of riparian forest and possibly wetland acreages would result. Educating the community and creekside homeowners about biological mitigation and habitat protection associated with the project would increase the likelihood of successful mitigation efforts for all resources.

Minimize Vegetation Impacts Alternative

Impacts on wildlife for the Minimize Vegetation Impacts Alternative would be similar to those for the Preferred Project, but they would affect smaller acreages in Reaches 9-10A and Reaches 10C-11A. Figures 4.12-4 and 4.12-6 in the "Vegetation" section illustrates impacts on sensitive vegetation types and wildlife habitats for the Preferred Project and the Minimize Vegetation Impacts Alternative, respectively. Levels of significance, mitigation measures, and replacement ratios would be the same for all impacts on wildlife as for the proposed project.

Some impacts cannot be predicted and therefore cannot be compared quantitatively between the Minimize Vegetation Impacts Alternative and the Preferred Project. Impacts on wildlife that cannot be quantified include:

- Disturbance of riparian wildlife habitat adjacent to construction areas,
- Construction disturbance to wildlife species along the Guadalupe River,
- Periodic disturbance and removal of wildlife habitat for floodway maintenance,
- Potential long-term decline in riparian forest vigor resulting from removal of adjacent forest,
- Loss of yellow warbler breeding habitat,
- Potential disturbance to breeding burrowing owls, and
- Fragmentation of riparian forest.

Substantially less yellow warbler breeding habitat would be removed in Reaches 9-10A and 10C-11A under the Minimize Vegetation Impacts Alternative (Tables 4.12-7 and 4.12-10 in the "Vegetation" section).

Potential disturbance to breeding burrowing owls would be the same as for the Preferred Project because potential breeding habitat for the owls occurs in Reach A and Reach 12.

Substantially less fragmentation of riparian forest would occur under the Minimize Vegetation Impacts Alternative. Tables 4.12-5 and 4.12-9 in the "Vegetation" section illustrate riparian losses for the Preferred Project and the Minimize Vegetation Impacts Alternative by reach.

The Ricksecker's water scavenging beetle is not expected to occur in the project area; therefore, no impacts on potential habitat for the beetle would occur under the Preferred Project or the Minimize Vegetation Impacts Alternative.

Losses of sensitive habitat types that can be quantified by acreage are compared for the Preferred Project and the Minimize Vegetation Impacts Alternative in Table 4.13-2. These impacts include:

- Loss of riparian wildlife habitat,
- Removal of urban forest wildlife habitat,
- Removal of nonforest upland wildlife habitat,
- Loss of wetlands and aquatic wildlife habitat, and
- Loss of potential San Francisco forktail damselfly habitat.

Mitigation Measures

Mitigation measures for the Minimize Vegetation Impacts Alternative would be the same as those for the Preferred Project, except that mitigation acreages would be reduced in proportion to the reduction in impacted acreage.

No-Project Alternative

No construction impacts on wildlife would occur under the No-Project Alternative; however, long-term benefits resulting from the mitigation plan (a net gain of riparian forest and reduction of non-native plants in the riparian forest) would not occur. Existing and ongoing operations and maintenance and erosion control practices that were described in the "Vegetation" section under "Operational Impacts" would continue.

4.14 FISHERIES

Affected Environment/Setting

Methods (Data Collection)

Historical information on the fisheries resources of San Francisco Bay and Guadalupe River was obtained from the scientific literature (Skinner 1962, Leidy 1984). Information on aquatic habitats and existing fishery resources of Guadalupe River was obtained primarily from field surveys conducted by The Habitat Restoration Group and District fisheries biologists; DFG and USFWS file data; and conversations with DFG (Anderson 1993), USFWS (Fris 1993), the District (Gilroy 1996), and The Habitat Restoration Group personnel (Elsey 1993, Smith 1992). The Habitat Restoration Group fisheries biologists conducted stream surveys of the Guadalupe River in 1986 and 1987 to sample existing fish populations and map stream habitat within the study area. Additional field surveys to evaluate shaded riverine aquatic (SRA) cover were performed in 1993 by biologists and vegetation specialists from Jones & Stokes Associates, The Habitat Restoration Group, and USFWS. More recently, the District performed chinook salmon spawning and carcass surveys during the 1995-1996 migration and spawning season and observed juvenile chinook salmon in the upper Guadalupe River in March 1996.

Fish Population Sampling and Aquatic Habitat Measurements

The Habitat Restoration Group sampled pool, riffle, and run habitats from Trimble Road (downstream of the project area) to Blossom Hill Road (Reach 12) using backpack electrofishing techniques during July, August, and September 1986 and in June 1987. Sampling was conducted to determine macrohabitat use and fish species composition in the study area. Additional sampling was conducted in November and December 1986 in the upper reaches of the Guadalupe River watershed, upstream of the District percolation ponds and the drop structure near Blossom Hill Road. During these surveys, captured fish were measured or assigned to size groups, and abundance ratings were determined for juvenile and adult fish where major differences in distribution or abundance occurred. In addition to surveying the fish population at each sampling site, The Habitat Restoration Group also mapped stream habitats within the study area and performed measurements of substrate quality and composition, streamflow, water temperature, and dissolved oxygen. Survey results are summarized later in this chapter and Appendix F-A (in Volume III) presents the detailed results of the surveys by The Habitat Restoration Group.

Chinook salmon and steelhead trout spawning habitat utilization was determined in 1986-1987 from redd counts (a redd is a fish nest constructed in the gravel) conducted by The Habitat Restoration Group. Additional field surveys conducted by biologists with The Habitat Restoration Group in 1992-1993, as part of a summer dam fishery impact study, documented the incidence of salmonid spawning near Branham Lane (Reach 11). More recently, District fisheries biologists conducted a chinook salmon spawning utilization reconnaisance level survey in 1995-1996 and a steelhead trout redd survey from stream gage No. 23B (Reach 10) to the Blossom Hill drop structure (Reach 13) in February 1996 (Gilroy 1996).

Shaded Riverine Aquatic Cover Surveys

Field surveys were conducted by Jones & Stokes Associates, The Habitat Restoration Group, and the USFWS in March, July, and August 1993 to determine the existing (pre-project) location and extent of SRA cover types present within the project reaches. SRA cover (Figure 4.14-1) is defined as nearshore aquatic habitat, at the interface between the river and adjacent riparian vegetation, consisting of overwater vegetation and instream woody cover (U.S. Fish and Wildlife Service 1989 and 1992). Surveys included mapping overwater vegetation on aerial photographs, estimating the amount of instream cover (e.g., undercut banks and woody debris), documenting general stream habitat features (e.g., eroding stream banks and stream bank protection), and updating previous stream habitat mapping delineations.

Affected reaches were surveyed on foot from the channel bottom. The location of existing undercut banks and the amount of overhead cover and undercut banks potentially affected by the project were delineated on 50-scale (i.e., 1 inch equals 50 feet) aerial bluelines. The boundary of the wetted channel was determined visually, and channel widths were measured periodically to ensure that channel location was accurately delineated, particularly in areas where dense overwater vegetation obscured the interface between the wetted channel and the stream bank. SRA cover impacts were evaluated by comparing the proximity of SRA cover features to proposed cut-bench elevations that had been surveyed and staked by the District prior to commencement of field surveys. Locations of existing and potentially affected undercut banks and overhead cover were determined by consensus of the survey team and based on professional judgment. Linear distances (in feet) of existing and potentially affected undercut banks, and linear distances and areas (in acres) of potentially affected overhead cover, were planimetered and totaled for each river segment between station numbers. The linear distance of overhead cover was assumed to be the length of stream bank intercepted by overwater vegetation. Impact acreages and distances were then totaled for each affected reach.

Regional Setting

Central Valley and San Francisco Bay

Chinook salmon (*Oncorhynchus tschawytscha*) and steelhead trout (*O. mykiss*) are major sport and commercial (salmon only) species that use the San Francisco Bay and the Sacramento-San Joaquin River Delta for rearing and as a migration corridor to and from streams in the Central Valley. Four races of chinook salmon (i.e., fall, late-fall, winter, and spring run) occur in the Sacramento River system; their race based largely on the timing of adult migration and differences in juvenile rearing strategies. Only winter-run steelhead trout occur within the Sacramento-San Joaquin River system, including the Guadalupe River system.

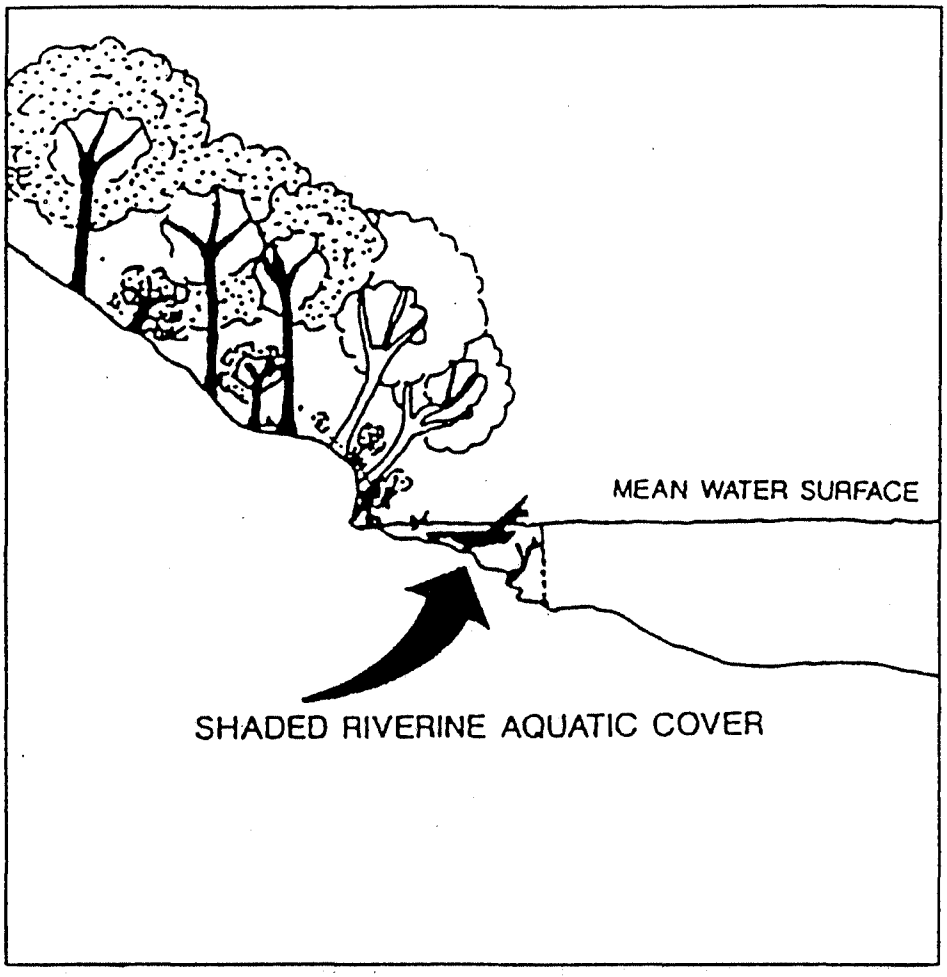


Figure 4.14-1. Shaded Riverine Aquatic (SRA) Cover Habitat

U.S. Fish and Wildlife Service 1989 and 1992.

Chinook salmon and steelhead trout are not only economically important in California, they are considered to be good indicator species of habitat degradation because of their relative sensitivity to environmental change; change that also affects other native species. Chinook salmon and steelhead trout are anadromous species. They leave freshwater as juveniles and spend the adult portion of their lives in the ocean before returning to their natal streams to spawn. When adult fish reach sexual maturity, they migrate into the Bay and up their natal river to spawn. The eggs are deposited in redds constructed in clean gravel where the alevins (small fish that still possess a yolk sac) remain in the gravel until the yolk sac is depleted. The fry (small fish with no yolk sac) then emerge from the gravel and rear in streams and rivers until undergoing a physiological change (a process called smoltification) to allow the fish (now called smolts) to migrate from freshwater to saline water. Although the life cycle of chinook salmon and steelhead trout are similar, there are important distinctions between them. These distinctions are discussed in greater detail below under, "Chinook Salmon and Steelhead Trout."

Generally, the current abundance and distribution of chinook salmon and steelhead trout populations in the Sacramento-San Joaquin River system (which includes the drainages flowing into San Francisco Bay) is much lower, compared to historic levels (Clark 1929, DFG 1991, Department of Water Resources [DWR] 1984, and Moyle 1976). This downward trend has generally occurred for many of the other populations throughout their range. Water project operations (i.e., reservoir operations and diversions); habitat modifications associated with levee construction, flood control projects, and urbanization; pollutants; non-native species introductions; and fishing (both commercial and sport fishing) are some of the factors affecting local and regional chinook salmon and steelhead trout populations. The continual declines in abundance over the past several decades of naturally-reproducing steelhead trout populations along the west coast of the United States (including California) as a result of natural and human factors have prompted the National Marine Fisheries Service (NMFS) to propose steelhead trout as threatened or endangered under the federal Endangered Species Act (ESA).

The San Francisco Bay Area historically has supported a diversity of native fishes. Many of the native species have declined in abundance and distribution, while a few have been completely extirpated from their former range. For example, Scoppettone and Smith (1978) and Aceituno et al. (1976) documented the extensive losses of native fish species in Alameda and Coyote Creeks, and Leidy (1984) documented losses throughout the San Francisco Bay Area. No fish species in the South Bay Area is officially listed as rare or endangered, but many, especially lowland species, are extremely depleted throughout their range. One Bay Area fish, the thicktailed chub (*Gila crassicauda*), is now extinct and another, the Sacramento perch (*Archoplites interruptus*), is being considered for state listing as rare because of rarity within its native range. Many non-native species, some of which prey on native fish or compete with native species for shared resources (e.g., food and space), have become well established.

Leidy (1984) concluded that steelhead trout and/or rainbow trout were once common in Bay Area streams, but that urbanization has resulted in the alteration and destruction of stream

habitats within the area and resulted in the reduction of most runs and the elimination of some runs. Leidy further concluded that, "among adverse impacts associated with urbanization are channel modification, elimination of riparian vegetation, creation of barriers to fish migration, reduced flows, and deterioration of water quality." Presently, documented steelhead trout runs in the South Bay occur in Alameda, Penitencia, San Francisquito, and Stevens Creeks and the Guadalupe River (Leidy 1984, Gilroy 1996). Coho salmon (*O. kisutch*), which are not native to the Sacramento-San Joaquin River system, apparently occurred in at least some of the streams tributary to the San Francisco Bay (Skinner 1962). Controversy exists over whether coho salmon occurred historically in the Guadalupe River system. Although Skinner (1962) does not reference the Guadalupe River by name as having an historic population of coho salmon, his species distribution maps for South Bay streams includes the Guadalupe River as part of the "probable historic distribution for coho salmon and/or steelhead trout." Skinner did include the Guadalupe River as a "lightly used stream" in 1962 by one or both of these species (Skinner 1962). Leidy (1984) reported that small spawning runs occur in Corte Madera and Mill Valley Creeks, which flow into the northern San Francisco Bay. Chinook salmon are rarely found in Bay Area streams (Skinner 1962, Leidy 1984); however, they presently migrate up the Guadalupe River and spawn (Gilroy 1996).

Guadalupe River and Tributaries

Moyle (1976) characterizes the streams tributary to the San Francisco Bay, including the Guadalupe River, as being an extension of the Central Valley subsystem of the Sacramento-San Joaquin River drainage system based on the similarity in fish species. However, streams draining into San Francisco Bay differ from Central Valley streams in that they flow directly into the Bay (a saline environment) preventing the movement of true freshwater species between drainages. Streams tributary to the San Francisco Bay each have a transition zone where fresh and saline waters meet (and therefore a fish assemblage of species tolerant to widely fluctuating environmental conditions), and are heavily urbanized in their lower reaches (Leidy 1984). Leidy (1984) reports that rapid urbanization and resulting alteration of aquatic habitats, coupled with species introductions, have had a dramatic affect on the historic fish fauna, particularly for streams tributary to the South Bay.

Historical Fisheries Resources

Results of fish sampling conducted in 1895 by Snyder indicate that at least five native fish species, including rainbow trout, California roach (*Lavinia symmetricus*), threespine stickleback *(Gasterosteus aculeatus)*, Sacramento sucker (*Catostomus occidentalis*), and prickly sculpin (*Cottus asper*) were present in the Guadalupe River drainage (Leidy 1984). Sampling occurring in later years determined that two other native species, Sacramento squawfish *(Ptychocheilus grandis)* and riffle sculpin (*Cottus gulosus*), also were present in the drainage, although Sacramento squawfish appears never to have been common in the drainage (Leidy 1984). From 1953 to 1981, there had been a dramatic increase in the number of introduced species (Table 4.14-1). By 1981, native species within the Guadalupe River drainage had been largely replaced by introduced species in the lower and mid-elevation stream reaches of the drainage, while native fish assemblages had remained relatively

TABLE 4.14-1

OCCURRENCE OF FISHES IN VARIOUS COLLECTIONS FROM GUADALUPE RIVER DRAINAGE, 1895 TO 1981

Species	Snyder 1895	Hubbs 1922	Fry 1936	Taft and Shapovalov 1937	Merkel 1953	CDFG 1975	Leidy 1981
Native Species							
Oncorhynchus mykiss Rainbow trout	X				X		X
Lavinia symmetricus California roach	X	X	X	X	X	X	X
Ptychocheilus grandis Sacramento squawfish		X					
Gasterosteus aculeatus Threespine stickleback	X	X	X	X	X		
Catostomus occidentalis Sacramento sucker	X	X			X		X
Cottus asper Prickly sculpin	X				X		X
Cottus gulosus Riffle sculpin						X	X
Non-Native Species							
Cyprinus carpio Carp							X
Carassius auratus Goldfish						X	X
Notemigonus crysoleucas Golden shiner							X
Lepomis gibbosus Pumpkinseed							X
Lepomis cyanellus Green sunfish							X

TABLE 4.14-1 (continued)

Species	Snyder 1895	Hubbs 1922	Fry 1936	Taft and Shapovalov 1937	Merkel 1953	CDFG 1975	Leidy 1981
Lepomis macrochirus Bluegill						X	
Lepomis microlophus Redear sunfish							X
Pomoxis nigromaculatus Black crappie							X
Micropterus salmoides Largemouth bass							X
Micropterus dolomieu Smallmouth bass							X
Gambusia affinis Mosquitofish					X	X	X
Menidia berryllina Mississippi silverside							X
Lucania parva Rainwater kill fish							X
Ictalurus nebulosus Brown bullhead							X
Percent native species	100	100	100	100	83	40	28

Source: Leidy 1984

unchanged in the undisturbed headwater and mid-elevation stream reaches of the drainage (Leidy 1984). Furthermore, streams tributary to the South Bay had a significantly lower number (42 percent) of sampling stations dominated by native species compared to North Bay stream sampling locations (71 percent), while South Bay tributary streams had a significantly higher frequency (22 percent) of occurrence of introduced species than North Bay tributary streams (9 percent) (Leidy 1984). Generally, the South Bay drainages are more urbanized than the North Bay drainages.

Fish Species Known to Occur Within The Project Area

Based in part on sampling by biologists with The Habitat Restoration Group, native and introduced fish species are known to occur within the project area (i.e., Reach A and Reaches 6-13). Native species include both anadromous and resident species. Native anadromous species include chinook salmon, steelhead trout, and Pacific lamprey (*Lampetra tridentata*). Native resident fish species include Sacramento sucker, California roach, hitch (*Lavinia exilicauda*), prickly sculpin, and riffle sculpin. Introduced species include largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), goldfish (*Carassius auratus*), carp (*Cyprinus carpio*), mosquitofish (*Gambusia affinis*), brown bullhead (*Ictalurus nebulosus*), and pumpkinseed (*Lepomis gibbosus*) (White 1991 1993, Gilroy 1996). Tributaries in the upper reaches of the Guadalupe River drainage contain primarily native species, such as rainbow trout, California roach, Sacramento sucker, and sculpin. Appendix F-A (in Volume III) provides the relative composition, distribution, and abundance of fish species collected in 1986 and 1987 by The Habitat Restoration Group in the Guadalupe River and tributary streams.

Steelhead Trout and Chinook Salmon

Steelhead trout and chinook salmon are not only economically important in California, they are considered to be good indicator species of habitat degradation because of their relative sensitivity to environmental change. Consequently, efforts to protect steelhead trout and chinook salmon populations and their habitat would likely protect other fishery resources. Because little information exists on the specific biology, ecology, and behavior of steelhead trout and chinook salmon in the Guadalupe River, the best available information presented in the scientific literature was used to provide the background on the temporal occurrence, life history, and habitat requirements of steelhead trout and chinook salmon. Much of the information on steelhead trout is summarized from Shapovalov and Taft (1954). Shapovalov and Taft conducted a comprehensive investigation of steelhead trout of Waddell Creek, a coastal stream in Santa Cruz County. Because Waddell Creek is in the same region of California as the Guadalupe River, the ecology of the Guadalupe River steelhead trout is similar to that of the Waddell Creek steelhead trout.

Information on the current distribution and abundance of steelhead trout and chinook salmon in the Guadalupe River is based primarily on recent information collected by fisheries biologists from The Habitat Restoration Group and the District.

Steelhead and Rainbow Trout. Steelhead trout exhibit one of the most complex life histories of any trout or salmon species. Steelhead trout are capable of having an anadromous life history or a freshwater residency. Resident individuals are typically referred to as rainbow trout, while anadromous individuals are called steelhead trout. Steelhead trout are also capable of remaining in freshwater, maturing, and spawning without ever going to the ocean, although these individuals are much smaller than those having gone to the ocean. Generally, it is not possible to distinguish juvenile (pre-smolt) steelhead trout from resident trout while in freshwater.

NMFS has completed a comprehensive status review of West Coast steelhead trout populations within California, Idaho, Oregon, and Washington and has identified 15 Evolutionary Significant Units (ESUs) within this range. Five of these ESUs are proposed for listing as threatened or endangered under the federal ESA (61 FR 41541-41561, August 9, 1996). One of the five ESUs proposed for listing as threatened, the Central California Coast ESU, includes river basins from the Russian River (Sonoma County) to Soquel Creek (Santa Cruz County), and the drainages of the San Francisco and San Pablo Bays.

Distribution and Abundance. Little information exists on the historical and current distribution and abundance of steelhead trout in the Guadalupe River system. Historically, steelhead trout potentially existed throughout the watershed (Skinner 1962). However, after completion of Almaden and Guadalupe Reservoirs in the mid-1930s and Lexington Reservoir in 1952, steelhead trout were restricted to tributary streams downstream of the dams. By 1962, there had been a progressive decline in the size of the steelhead trout runs in the Guadalupe River (Skinner 1962). No specific data exists on the trends of steelhead trout abundance from 1962 to the present. Currently, steelhead trout entering the Guadalupe River system are prevented from migrating to their historical spawning and rearing areas by the District's drop structure near Blossom Hill Road, which was originally constructed in the 1930s and later reconstructed in 1977; consequently, any steelhead trout entering the Guadalupe River system are forced to spawn in the lower reaches of the Guadalupe River and in Los Gatos Creek, where less suitable habitat and streamflow conditions occur, and in Ross Creek. Based on anecdotal information, the drop structure may not be a complete barrier to adult steelhead trout migration. Some adult steelhead trout may be able to pass the drop structure when high flows reduce the height of the jump and create more favorable hydraulic conditions immediately below the structure (Gilroy 1996). There have been unconfirmed reports by the public that large fish have been observed jumping the drop structure during the chinook salmon and steelhead trout migration seasons. Resident rainbow trout populations continue to exist upstream of this barrier in the tributary streams, such as Alamitos and Guadalupe Creeks, and in the upper watershed upstream of Almaden and Guadalupe reservoirs (additional information on habitat conditions in these tributary streams is provided below; see "Existing Fishery Habitat").

Information on the recent occurrence of steelhead trout in the Guadalupe River is limited to anecdotal information of unconfirmed sightings of adults by the public and redd surveys and observations by Habitat Restoration Group and District biologists. Adult steelhead trout have been observed below the Blossom Hill drop structure in February 1994 (The Habitat Restoration Group 1995) and as recently as February 1996 by District biologists (Gilroy

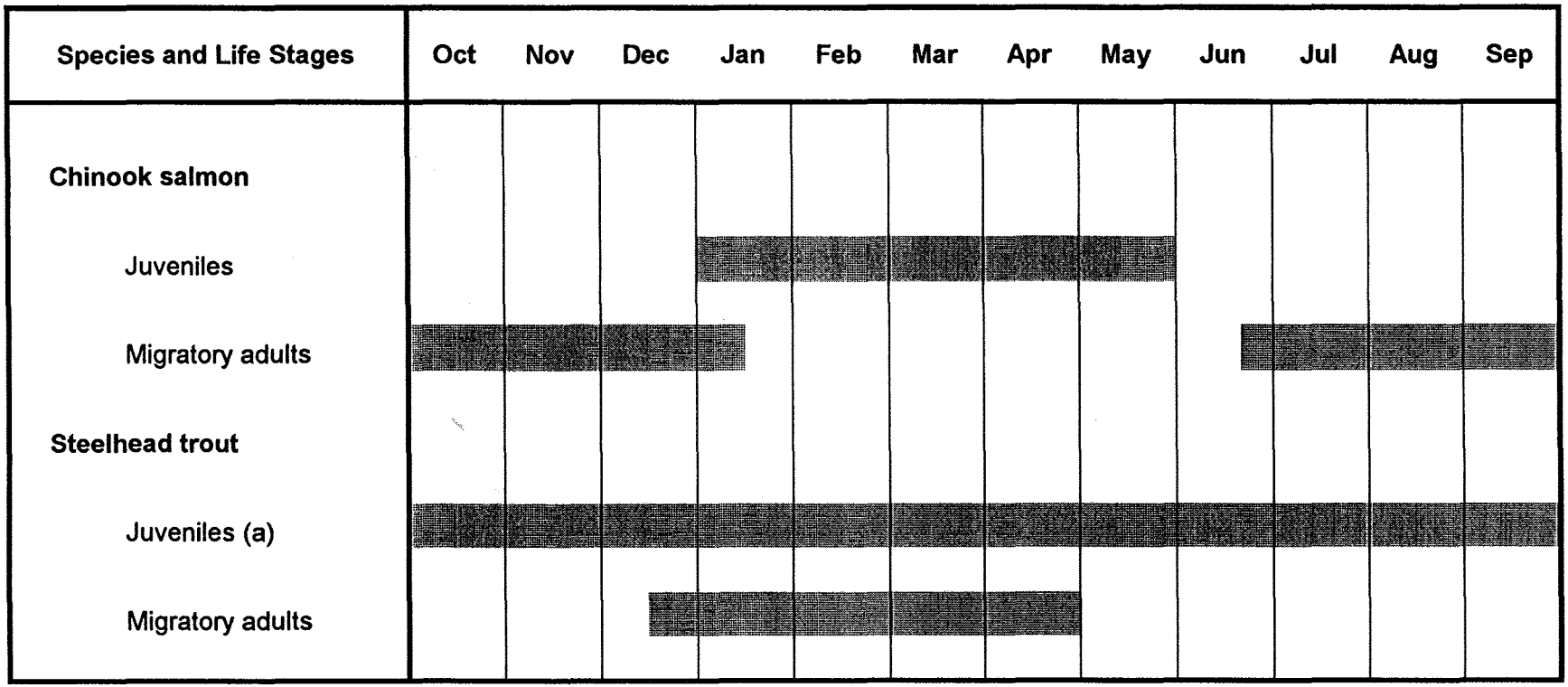
1996). A total of three juvenile trout were collected during sampling near Alma Avenue (Reach 9) and downstream of the Blossom Hill drop structure in April and May 1995 (The Habitat Restoration Group 1995). The three juvenile trout may represent juvenile steelhead trout or juvenile rainbow trout washed downstream from Alamitos and Guadalupe Creeks during high flows (The Habitat Restoration Group 1995). Because steelhead trout populations are declining both locally and throughout their range, NMFS has proposed steelhead trout for listing as threatened or endangered under the federal ESA.

Life History. Only winter steelhead trout occur within the Central California Coast ESU (61 FR 41541-41561, August 9, 1996). Generally, adult steelhead trout within this ESU enter rivers from October (in larger basins) and late November (in smaller basins), and continue through June. Adults spawning begins in November (in larger basins) and December (in smaller basins), and can continue through April with a peak in February and March (61 FR 41541-41561, August 9, 1996). Because little other life history information exists for steelhead trout in this ESU, the following life-history information is summarized from Shapovalov and Taft (1954).

Adult steelhead trout leave the ocean to migrate up coastal streams and inland rivers on high streamflows from early November through early May, although the majority probably enter freshwater from late December through late April (Figure 4.14-2). The timing and rate of migration depend on several factors, including stream discharge and water temperatures. Spawning can occur shortly thereafter or may occur later, depending on the sexual maturity of the fish, but probably peaks from January through March. Adult steelhead trout spawn in shallow redds (nests) constructed in relatively clean, loose gravels typically at the tail-end of pools and at the head of riffles where appropriate water depths and water velocities occur. After depositing the eggs in the redd, the females cover the eggs with gravel as they construct the next spawning depression in the gravel. Unlike all Pacific salmon, which die after spawning, adult steelhead are capable of returning to the ocean after spawning, typically by June of that same year. (Shapovalov and Taft 1954).

The eggs incubate within the gravel and hatch anywhere from about 19 to 80 days at water temperatures ranging from 60°F to 40°F, respectively. The average period eggs incubate is approximately 4-6 weeks. After hatching, the young fish (alevins) remain in the gravel for an additional 2-6 weeks before emerging from the gravel and taking up residence in the shallow margins of the stream. The juvenile fish feed primarily on insects, for periods ranging from less than 1 year to 4 years. Most juvenile steelhead trout spend 1-3 years in freshwater before emigrating to the ocean as smolts. (Shapovalov and Taft 1954).

Most juvenile steelhead trout typically migrate to the ocean as streamflow declines and water temperature increase in April, May, and June. Before their downstream migration, the juveniles undergo physiological changes (smoltification) to prepare them for ocean life. Steelhead trout live in the ocean generally for 1-3 years before returning to freshwater to spawn. Because juvenile steelhead trout rear year-round in freshwater, adequate streamflows,



(a) It has not been determined whether juvenile steelhead trout rear year-round in the Guadalupe River

Source: Shapovalov and Taft 1954, White 1993, Moyle 1976.

Jones & Stokes Associates, Inc.

Figure 4.14-2
Approximate Temporal Occurrence of Chinook Salmon and Steelhead Trout in the Guadalupe River

adequate water temperatures, and an abundant food source are necessary year-round to sustain steelhead trout populations, especially during the summer low-flow period. It has not been determined whether juvenile steelhead trout rear through the summer in the Guadalupe River, where water temperatures in summer often exceed 70°F.

Habitat Requirements. Requirements for optimal juvenile rearing include adequate cover, residual pool depths, food supply, and water temperatures of 43°-65°F (Raleigh et al. 1984). Smith (1982) found steelhead trout juveniles residing in streams of the Pajaro River drainage where summer water temperatures were approaching 74°F. Juvenile survival at these warmer water temperatures depends, however, on a number of factors (e.g., exposure duration, acclimation factors, food availability, water quality [specifically dissolved oxygen concentrations], and ground water dynamics). In general, the upper lethal temperature for trout is 77°F (Raleigh et al. 1984). Juvenile steelhead trout primarily occupy riffle habitats, although pool habitats with adequate water depth and escape cover are especially critical during the summer low-flow period and during extensive periods of drought. Summer rearing conditions usually restrict overall steelhead trout populations due to reduced living space, increased competition for food and habitat, and poorer water quality conditions resulting from elevated water temperatures, reduced streamflows, and increased concentrations of pollutants. Cobble-size substrate can also be an important component of winter habitat as well.

Chinook Salmon. Although there is no historical account of chinook salmon migrating and spawning in the Guadalupe River, fall-run chinook salmon have been occurring in the Guadalupe River at least during the last decade. The current chinook salmon population may be a remnant of an undocumented population indigenous to the Guadalupe River, or they may be strays from wild or hatchery populations from the Sacramento-San Joaquin River system (The Habitat Restoration Group 1995). Several factors raise suspicion that the Guadalupe River chinook salmon population may have resulted from hatchery strays. Since the early 1980s, DFG has been releasing hatchery reared chinook salmon to the Delta to reduce downstream mortality, about the same time that chinook salmon were first noted in the Guadalupe River. The tendency for these fish to stray as returning adults is greater than fish released directly from the hatchery. In 1983, IBM and Fairchild began pumping contaminated groundwater, treating it, and discharging to Canoas Creek, a tributary of the Guadalupe River (additional information on Canoas Creek is provided below; see "Existing Fishery Habitat - Canoas Creek").

This discharge of treated groundwater provided a steady year-round flow to the creek (and river) in the mid-1980s, making the Guadalupe River one of the best watered streams in the South Bay. Groundwater pumping and related discharges have been declining since 1988 and are currently near zero. One additional factor that may have led, or has continued to foster straying into the Guadalupe River system, is the release of Central Valley water from the Central Valley Project via the San Felipe Project. Chinook salmon, which return to their natal streams via olfactory cues, may be drawn to the South Bay as they migrate through the Bay on the way to Central Valley streams. The San Felipe Project began delivering water

from San Luis Reservoir to Calero Reservoir, which impounds a stream tributary to the river, in 1986 (USGS 1988).

The current population may be a result of one or more of these factors, natural production (juvenile chinook salmon have been documented in Reach 11 [Gilroy 1996]), or a combination of these factors. Because the origin of these fish is of considerable debate, DFG initiated genetic testing of adult chinook salmon in 1994. The purpose of the study was to determine whether Guadalupe River adult chinook salmon differed genetically from hatchery chinook salmon populations from the Sacramento River. The results of the genetic analysis have been inconclusive; relatively small sample sizes and genetic marker selection can limit the ability to identify the exact origin of individuals. Results of the analysis of the 1994 spawning chinook salmon populations in the Guadalupe River show that the genetic origin of 6 of the 29 adult fall-run chinook salmon could not be identified with any known wild or hatchery population sampled to date in the Central Valley. Two of the 29 showed similarities with Russian River fish. However, the study cautioned that more sampling of Central Valley hatchery populations is needed before it can be concluded that these 6 fish are not hatchery strays. The results of the analysis suggest that the origin of the remaining 21 adults sampled in 1994 are the same as Merced River and Feather River hatchery stocks, using the methods employed in the analysis. (Nielson 1995).

DFG has stated that their focus, with respect to fisheries management objectives in the Guadalupe and Coyote River drainages, is the perpetuation and restoration of endemic fish populations, including steelhead trout populations, and not hatchery strain chinook salmon (Anderson 1996). Furthermore, DFG does not place any 'special species' designation on Guadalupe River chinook salmon (Anderson 1996).

Regardless of their origin, chinook salmon currently migrate up the Guadalupe River, and to a lesser extent Los Gatos Creek, to spawn.

Distribution and Abundance. No known information exists on the historic distribution and abundance of chinook salmon in the Guadalupe River. Furthermore, there is little specific data on the current abundance of chinook salmon in the Guadalupe River. Information on the current distribution is based on surveys to document adult migration and spawning by DFG, the Guadalupe-Coyote Resource Conservation District (GCRCD), The Habitat Restoration Group, and the District. Limited information exists on juvenile chinook salmon in the Guadalupe River.

Adult chinook salmon migrate up the Guadalupe River from the mouth near the town of Alviso and have been reported as far upstream as the District's drop structure immediately upstream of Blossom Hill Road. Spawning occurs over a wide area, presumably where suitable gravels and conditions (i.e., water depth and velocity, and water temperature) exist. Because these conditions can vary between storms and from year to year, spawning habitat utilization and locations may also vary. Chinook salmon were observed spawning in the Guadalupe River near Willow Glen Way in November of 1986 and 1987, and other salmon were also observed near the mouth of Los Gatos Creek. During stream surveys conducted in 1987 by the Habitat Restoration Group, 28-31 redds were found at 13 potential spawning sites within the Guadalupe River from Canoas Creek to 1-280. The greatest concentration of

redds (12-13) was from Willow Glen Way to Malone Road (Reach 9A) and Willow Street to Alma Avenue (Reach 7A) where 12 redds were found. More recently, District fisheries biologists conducted a redd survey of the river from Montague Expressway to the drop structure in late 1995 and early 1996 to determine spawner utilization (Gilroy 1996). Surveys documented the number of live chinook salmon, carcasses, and redds. Of the 57 total redds located during this survey, the majority of redds (21) were found between Airport Boulevard and Coleman Avenue, followed by Montague Expressway to Airport Boulevard (14), Coleman Avenue to St. Johns Street bridge (10), Curtner Avenue to Branham Lane (7), Branham Lane to the drop structure and St. Johns Street bridge to Grant Avenue (2), and Grant Avenue to Curtner Avenue (1) (Gilroy 1996). Total redd counts were not estimated and factors such as access, changing flow conditions, and water clarity may have affected the results.

No specific data exists on total abundance of adults and juvenile chinook salmon for the Guadalupe River, although The Habitat Restoration Group (1995) estimated the adult spawning population during a several week period in late November to early December 1994 to be between 46 and 201 fish, based on a mark and recapture study. No live adults, carcasses, or redds were observed on Ross Creek.

No specific data on juvenile abundance exists for the Guadalupe River, although juveniles were observed by District fisheries biologist near Branham Lane in February 1996 (Gilroy 1996). In 1993 and 1995, the USFWS and The Habitat Restoration Group, respectively, were unsuccessful in collecting juvenile chinook salmon from selected sites along the Guadalupe River, despite sampling when juveniles would be expected to occur and in sites where known spawning had occurred the previous fall (White 1993, The Habitat Restoration Group 1995). However, the absence of juveniles may have been because outmigration had already occurred (i.e., sampling too late in the season), insufficient sampling, low survival after emergence, or poor or no spawning success due to poor habitat conditions (i.e., poor gravel quality, high flows, or unsuitable water temperatures).

Life History. Chinook salmon have a similar life history as that of steelhead trout, except for several important differences discussed below. Unlike steelhead trout, all Pacific salmon die after spawning and the majority of juveniles migrate to the ocean within a few months after emerging from the gravel.

Adult fall-run chinook salmon have a protracted migration and spawning season, extending from late-June or July and into January. Most adults spawn soon after reaching spawning areas, although those that arrive early (i.e., July through September) appear to "hold-over" in the lower reaches of the river near or downstream of the San Jose Municipal Airport until seasonal rains result in more suitable conditions for successful passage, spawning, and egg incubation. Those adults that arrive later in the migration season probably spawn shortly after entering the river.

In the Guadalupe River, adult chinook salmon have been observed in the lower reaches (near the town of Alviso) as early as late-June (Castillo 1996). They have been observed migrating as far upstream as Reach A (which is adjacent to the San Jose Airport) as early as September and October (Bernardi 1995). In the project area (i.e., Reaches 6-13), adults first were

observed (in 1994) at Hillsdale Avenue (Reach 10C) on November 9th, when measured water temperatures were 60°F (Bernardi 1995). Migration of adults into the upper reaches of the Guadalupe River (i.e., Reaches 6-13) probably depends on improved passage conditions and cooler water temperatures in response to seasonal rains. No conclusive information is available on the timing of peak migration and spawning in the Guadalupe River. In the Sacramento-San Joaquin Delta, adult fall-run chinook salmon migration begins in May, peaks in September, and continues to January. Fall-run chinook salmon normally enter a stream late enough so that a suitable supply of cold water is available for spawning (Fry 1973). Peak spawning activity in the Central Valley typically occurs in October and November.

Chinook salmon spawning behavior is similar to that of steelhead trout; however, all chinook salmon die after spawning. Female chinook salmon construct redds at the heads of riffles and the tail-end of pools where suitable water depths and water velocities occur. Because of their larger size, chinook salmon select gravels that are larger (up to 6 inches) than those selected by steelhead trout. Egg survival in the redds depends on several factors, including water temperature, the percolation rate of water through the gravel, dissolved oxygen concentrations, and gravel composition. In general, egg survival is reduced when water temperatures are too warm, dissolved oxygen concentrations and percolation rates are reduced, and the percentage of fine sediments in the gravels increases.

For maximum egg and embryo survival, water temperatures have to be less than 57°F (Moyle 1976). Based on USGS and H.T. Harvey water temperature data for the Guadalupe River (Hydrosphere 1995; Neudorf 1995), optimal water temperatures for maximum egg survival appear not to occur until November. In 1994, suitable water temperatures for chinook salmon egg incubation and embryo development were present from at least as early as late-November to mid-February (The Habitat Restoration Group 1995). Based on the temperature data and spawn timing of adults in fall 1994, fry emergence was estimated to occur from mid-January to mid-February (The Habitat Restoration Group 1995). Generally, chinook salmon eggs hatch in late winter and spring (January to April) depending on the spawn timing and water temperatures (egg incubation is inversely related to water temperature).

While in freshwater, juvenile chinook salmon feed on insects and select shallow water habitats along the margins of streams. As they grow they often switch to habitats containing deeper water (from 0.5-3.0 feet), overwater vegetation, surface turbulence, and instream structure (i.e., root-wads, undercut banks, and woody debris) (Raleigh et al. 1986). Similar to steelhead trout, juvenile chinook salmon can tolerate water temperatures as warm as 75.2°F, but the optimal range for survival and growth is 53.6°-64.4°F (Raleigh et al. 1986). As the juveniles grow, they undergo a process called smoltification, which stimulates them to emigrate and prepares them for ocean life. Figure 4.14-2 presents the approximate temporal occurrence of chinook salmon in the Guadalupe River by life stage.

Habitat Requirements. Habitat requirements of chinook salmon are similar to steelhead trout, except that because their young emigrate to the ocean within a few months of hatching, they are capable of reproducing and carrying out their life cycle in streams that completely dry up

(or nearly so) in late spring and summer. Consequently, adequate streamflow and water quality conditions are not a necessary requirement year-round as they are for steelhead trout.

Fisheries Habitat

Guadalupe River - General Characteristics. Historically, the Guadalupe River experienced tremendous fluctuations in streamflows in response to the distinct wet and dry seasons. Typically, peak flows occurred in the winter or early spring, and low flows in the late-summer and early-fall prior to the onset of seasonal rains. Snyder (1905) reported that, "on the approach of the dry season all of the streams of the region rapidly shrink, both in volume and length, only one of them, Coyote Creek, discharging water into the bay during the entire summer."

Presently, runoff in the Guadalupe River watershed is captured by Almaden, Guadalupe, and Arroyo Calero reservoirs (Figure 4.2-1). Water released from the reservoirs and the District's Almaden Valley pipeline maintains perennial stream habitat downstream on Guadalupe Creek to the Los Capitancillos percolation ponds along Coleman Avenue and on Guadalupe River to stream gage Station No. 23B (Reach 10B). The regulated flows are percolated in percolation ponds and in the streambed in the Blossom Hill area to recharge groundwater.

Percolation Pond Operation. In-channel flows in the past have been captured behind gravel dams placed in the river channel. Table 4.14-2 presents the location of summer percolation dams previously constructed on the Guadalupe River system. Under the conditions outlined in the previous memorandum of understanding (MOU) with DFG, the District constructed dams on the Guadalupe River from April 15 to October I but were required to use river-origin gravels containing less than 20 percent fines if the dams were to remain after October 15. Normally, the gravel dams were taken out before the onset of seasonal flows in fall.

The District is in the process of obtaining appropriate Corps permits and on April 4, 1995, issued a draft EIR on their seasonal percolation pond operations. Continuation of the percolation pond program is dependent on completion of the CEQA process and issuance of permits. For purposes of this EIR/EIS, it is assumed that percolation ponds would be operated in accordance with the previous MOU because future operational changes are unknown.

Data collected by The Habitat Restoration Group as part of a summer percolation pond study show that summer (August) water temperatures in existing ponds can approach 76°F near the bottom and 77°F at the surface (Elsey 1993). The optimal growth rate for steelhead trout occurs when water temperatures range from 59°F to 68°F. Because rainbow trout growth has been shown to cease when water temperatures exceed 73°F (Raleigh et al. 1984), the percolation ponds probably do not support steelhead and rainbow trout during summer. Even without the in-stream percolation ponds, Reach 12 probably is not optimal for steelhead trout in the summer due to elevated temperatures and the effects of predatory fish.

Upstream Reservoirs. Streamflows on the Guadalupe River have been altered since 1935, when Arroyo Calero (10,160 acre feet), Guadalupe (3,740 acre feet), and Almaden (1,780 acre feet) reservoirs were constructed near its headwaters and gravel mining and percolation

TABLE 4.14-2

SUMMER PERCOLATION SITES ON THE GUADALUPE RIVER SYSTEM IN THE BLOSSOM HILL AREA

Number	Name	Location
Guadalupe Creek - five ponds		
1	Los Capitancillos Dam No. 1	50 feet upstream of Meridian Avenue
2	Los Capitancillos Dam No. 2	1,000 feet downstream of Meridian Avenue
3	Los Capitancillos Dam No. 3	1,500 feet downstream of Meridian Avenue
4	Los Capitancillos Dam No. 4	50 feet upstream of Almaden Expressway
5	Alamitos Pond	Between District drop structure and Almaden Expressway
Guadalupe River - three ponds		
1	Blossom Hill Dam	1,200 feet downstream of Blossom Hill Road
2	Branham Lane Dam	500 feet upstream of Branham Lane
3	Capitol Expressway Dam	100 feet upstream of Capitol Expressway

Source: Habitat Restoration Group (unpublished data).

activities began upstream of Branham Avenue. The reservoirs are operated for water conservation purposes and not for flood control. However, if the reservoirs are relatively low during winter, peak flows in the Guadalupe River are slightly lower. If the reservoirs are relatively full during winter and spill, then runoff is unimpaired. During summer, releases are made from upstream reservoirs for groundwater recharge along the Guadalupe and Ross Creek channels. Streamflows have been altered by reservoir construction in accordance with established appropriative water rights licenses. Established water rights provide the District with the opportunity to appropriate water in the wet season. In the summer, flows under the influence of reservoirs are passed through the dams and released downstream. The District does not capture any flows in summer in these reservoirs. Reservoir construction and operation have altered summer flows such that stream reaches downstream of the dams experience more flows in summer than occurred prior to reservoir construction.

Los Gatos Creek is the largest tributary to Guadalupe River and joins the river near downtown San Jose. Flows in Los Gatos Creek have been regulated by Lexington Reservoir since 1952. Similar releases are made from Lexington Reservoir during summer for groundwater recharge and flows often percolate upstream of the confluence with the Guadalupe River.

Water resource projects in the watershed have also altered the gravel supply in the upper Guadalupe River. Reservoirs in the upper watershed, such as Guadalupe Reservoir on Guadalupe Creek, reduce gravel supply in downstream reaches because the dams intercept and trap gravels mobilized during flood events. Similarly, Alamitos Lake on Alamitos Creek, a tributary to the Guadalupe River, acts as a sediment trap. Together, the upstream reservoirs and Alamitos Lake have altered the sediment load in the Guadalupe River from historical conditions and likely have contributed to changes in the abundance, quality, and relative composition of gravels in the Guadalupe River.

Groundwater Pumping. From 1983 through 1991, 2,700 to over 16,000 acre-feet per year were added to flows in the Guadalupe River by groundwater pumping as part of a toxic waste cleanup program at IBM and Fairchild properties along Canoas Creek. These flows substantially improved riparian and aquatic resources from Canoas Creek downstream, and especially in Reach A and Reaches 6-9 by providing flows during summer, when discharges are normally reduced or eliminated. Additionally, these summer discharges have been sufficient to create habitat for fish species tolerant of warm water. However, discharges have been reduced from initial levels. Groundwater pumping supplied nearly all Canoas Creek flows during the summers of 1983 through 1991. Reductions in groundwater pumping are gradually returning streamflow conditions in the lower Guadalupe River downstream of Canoas Creek to conditions existing before groundwater pumping began.

Stream Gage Station No. 23B. Guadalupe River streamflows are measured and recorded at the District's stream gage Station No. 23B, which is located upstream of Canoas Creek and, therefore, reflects existing streamflow conditions. Based on the District's flow records, Guadalupe River flows in the project reach are variable not only across seasons but also within each month. During water years 1977-1991, Guadalupe River peak flows (1,500 cfs to 2,500 cfs) occurred in January through April, with considerably lower peaks (i.e., 400 cfs

to 800 cfs) occurring in November, December, and May. Average daily flows were considerably lower. Lowest flows occurred in June and were typically less than 5 cfs, when flow was present. Periods of no flow occurred in any month of the year and no flows occurred more than 50 percent of the time during summer (June-September).

Guadalupe River - Spawning and Rearing Habitat. Although highly modified, the Guadalupe River provides habitat for spawning and rearing of chinook salmon and steelhead trout. Riffle habitats (shallow, fast-water areas with broken surface) are important spawning and food-producing areas, and pools (deep, slow-water areas) can provide cover and summer rearing habitat for juvenile steelhead. Aquatic habitats with a 1:1 ratio of pools to riffles generally provide optimum rearing conditions for juvenile salmon and steelhead trout. Stream surveys conducted by The Habitat Restoration Group indicate that Guadalupe River habitats consists primarily of pools and runs (relatively fast flow with unbroken surface) in the lower reaches of the Guadalupe River, with riffles constituting less than 10 percent of the habitat. The stream sections with the highest percentage of pool and pool/run areas were West Virginia Street to Willow Street (Reaches 6 and 7), Willow Street to Alma Street (Reaches 6 and 7), and I-880 to Highway 101 (Reach A), where slow-water habitats (pools and pool/runs) made up 76 percent, 79 percent, and 71 percent of the section, respectively. The other four stream sections (Interstate 280 to West Virginia Street [Reach 6]; Alma Avenue to Willow Glen Way [Reaches 7C and 8]; Willow Glen Way to Malone Road [Reach 9A]; and Malone Road to Canoas Creek [Reach 9B and 10AB]) had 24-27 percent riffle/run and riffle habitats. The high stream flows in 1986 and 1987 provided deep, fast-water riffles and runs for feeding, and approximately 30 percent of the habitat from Canoas Creek to 1-280 was potentially suitable for chinook salmon and steelhead trout rearing habitat. The results of these surveys are presented in Appendix F-A (Volume III). Suitable rearing habitat exists further upstream, on Guadalupe and Alamitos Creeks and Arroyo Calero, but is presently unavailable to chinook salmon and steelhead trout because upstream migration is blocked by the District's drop structure upstream of Blossom Hill Road (Reach 13).

Riparian Vegetation and Shaded Riverine Aquatic Cover. Riparian vegetation provides fish with cover from predators; provides stream bank stability; increases habitat complexity; provides insects (a food source for juvenile salmonids) with attachment sites; and provides shade, which is important in maintaining water temperatures within ranges suitable for all fish life stages.

The amount of stream shading, based on the stream covered by overwater vegetation, varies considerably within the project area but averages 20 percent overall. Field surveys conducted by Jones & Stokes Associates, The Habitat Restoration Group, USFWS, and the District in 1993 determined that the highest shade value exists in Reaches 7 and 9, where midday shade averages 34 percent and 48 percent, respectively. Reaches 10B and 12 are the least shaded reaches, averaging 0 percent and 0.2 percent shade, respectively. Downstream of I-880 (Reach A), water temperatures often increase because of the more open riparian canopy and often exceed 75°F during summer. Table 4.14-3 presents the percentage of midday shade for each project reach.

TABLE 4.14-3

EXISTING SHADED RIVERINE AQUATIC COVER IN REACHES 6-12 OF THE GUADALUPE RIVER

Reach	Stream			Bank	Undercut Bank Length (ft)	Overwater Vegetation	
	Length (ft)	Area (ac)	Midday Shade (%)			Bank Length (ft)	Stream Area (ac)
6	2,536	1.125	20.0	East	1,070	783	0.085
				West	1,350	896	0.137
7	4,288	1.973	34.0	East	2,000	1,900	0.339
				West	2,265	2,266	0.328
8	1,484	0.696	30.0	East	440	625	0.070
				West	410	792	0.137
9	4,953	1.886	48.0	East	785	2,379	0.400
				West	1,305	3,184	0.507
10A	1,416	0.638	29.0	East	370	698	0.106
				West	500	726	0.079
10B	3,196	2.227	0.0	East	0	0	0.000
				West	0	0	0.000
10C	2,239	1.387	12.5	East	225	820	0.095
				West	205	591	0.079
11A	2,706	1.592	12.0	East	0	481	0.074
				West	30	584	0.121
11B	1,226	0.824	13.0	East	50	247	0.042
				West	20	249	0.063
11C	1,051	0.677	20.0	East	45	246	0.045
				West	40	344	0.088
12	5,706	4.522	0.02	East	0	137	0.001
				West	0	0	0.000
Subtotal				East	4,985	8,316	1.257
				West	6,125	9,632	1.539
Total	30,801	17.577	15.9[1]		11,110	17,948	2.796

Note: Shaded riverine aquatic cover consists of overwater vegetation and undercut banks.

1 Overall project average

Undercut banks also occur throughout most of the project reaches. Field surveys conducted by Jones & Stokes Associates, The Habitat Restoration Group, USFWS, and the District in 1993 determined that Reaches 6 and 7 have the greatest amount of undercut banks, with 2,420 and 4,265 linear feet for both banks combined, respectively. Reaches 10B and 12 have the least amount of undercut bank, with 0 feet each. Table 4.14-3 lists the amount of undercut bank present for each project reach.

Ross Creek. Ross Creek, an intermittent tributary to the Guadalupe River, flows in a northeasterly direction from its headwaters in the hills of the Town of Los Gatos before joining the Guadalupe River downstream of Branham Lane. Flowing through mostly residential areas, Ross Creek has been modified for flood control purposes. In addition, the District releases flows into Ross Creek to recharge groundwater, using water from the South Bay Aqueduct and the San Felipe Project.

Although recent fish sampling surveys of Ross Creek indicate that generally poor conditions for salmonids exist there, reports of fish occurrences in Ross Creek by local residents and District personnel suggest that Ross Creek may provide a migration corridor for anadromous salmonids to potential spawning areas upstream (California Department of Transportation 1992).

Anadromous fish production in Ross Creek may be limited, however, partly as a result of variable fish passage conditions that occur at the mouth of Ross Creek. Past channel modifications and culvert installations in lower Ross Creek created physical and hydraulic conditions unsuitable for fish passage. Excessive water velocities and shallow water depths may exceed fish swimming capabilities in the 200-foot-long, 12- by 10-foot RCB culvert located under the Almaden Expressway when Guadalupe River water surface elevations are lower than the culvert invert. Under certain flow conditions, the steep-sloped, concrete-lined channel located immediately downstream of the culvert may act as a vertical barrier. Although the Ross Creek channel invert elevation on the upstream side of the culvert is approximately 6 feet above the Guadalupe River channel elevation, HEC-2 modeling results indicate that Ross Creek is inundated by a backwater effect from the Guadalupe River, when river flows approach approximately 925 cubic feet per second (cfs) (a 2-year event), and may provide fish with suitable conditions for passage into Ross Creek.

As mitigation for impacts on fish migration on Ross Creek that were associated with construction of State Route (SR) 85, Caltrans was required to construct a fish bypass pipe on Ross Creek at the SR 85 crossing. In addition, a compliance monitoring program for the Ross Creek fish bypass was established, pursuant to DFG's streambed alteration agreement requirement. The purpose of this monitoring program is to determine whether steelhead trout and other native fish species can successfully pass through the bypass pipe.

Canoas Creek. Canoas Creek, an intermittent tributary to the Guadalupe River, flows through mostly residential areas and has been highly modified (i.e., channelized) for flood control purposes. Channel modifications have generally resulted in poor habitat conditions for fish, especially salmonids. Although the channel invert at the mouth of Canoas Creek is 5 to 5.5 feet above the Guadalupe River channel invert elevation, HEC-2 modeling results

indicate that the Canoas Creek channel invert is inundated when flows approach 1,754 cfs (a 2-year event) (Bravo 1993) and may provide fish with suitable conditions for passage into Canoas Creek. Chinook salmon have been observed by local anglers in Canoas Creek as recently as 1986 (California Department of Transportation 1992). DFG biologists have indicated, however, that habitat and flow conditions in Canoas Creek do not favor salmonid production and fish passage into Canoas Creek should be discouraged (Anderson 1993).

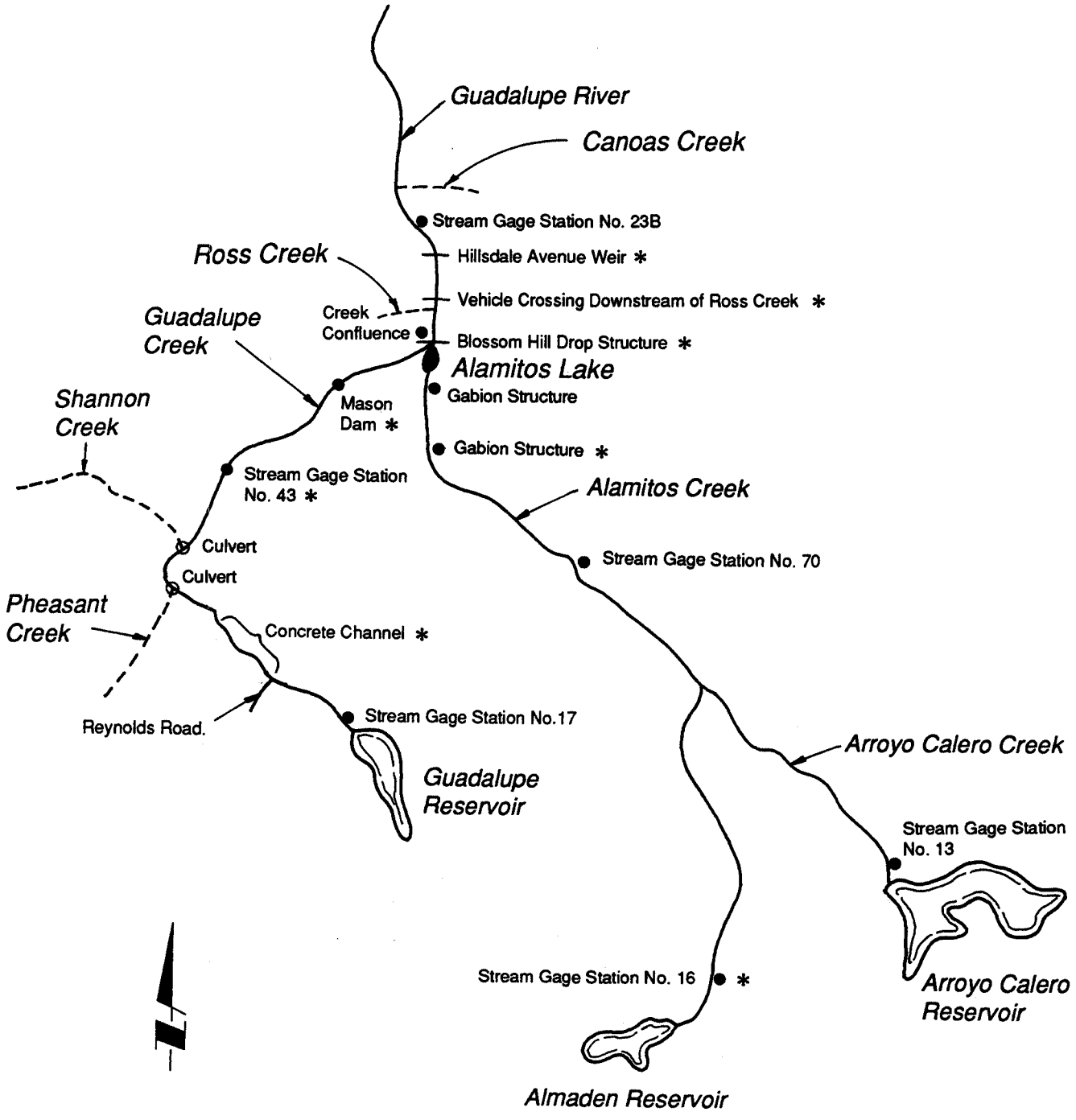
Upstream Tributaries. Habitat on the upstream tributaries (i.e., Alamitos, Calero, and Guadalupe Creeks) is considered to be relatively good, based on surveys conducted by the Service (White 1991). Pool and spawning riffle habitats are present in adequate proportions on each of the three creeks. Suitable spawning gravels (i.e., quantities of loose gravels) occur on Guadalupe Creek upstream of the District's percolation ponds (which are adjacent to Coleman Avenue) and along most of the length of Alamitos and Calero Creeks. A substantial amount of SRA cover is present on all three tributaries. Percent stream shading is variable depending on location but appears to be highest on Guadalupe Creek (30 percent to 80 percent), followed by Alamitos Creek (40 percent to 70 percent) and Calero Creek (30 percent to 40 percent). The high degree of stream shading combined with flow releases from the upstream reservoirs in summer appears to maintain summer water temperatures below 70°F in most reaches. All three creeks have a fish species composition similar to that known to exist in the Guadalupe River, in addition to a resident population of native rainbow trout, based on fish sampling surveys conducted by USFWS and The Habitat Restoration Group (White 1991; Habitat Restoration Group 1995). USFWS has indicated that these creeks could likely support a fair to moderate, self-sustaining anadromous fishery if downstream barriers were removed or modified to restore access to these tributary streams (White1991).

Factors Affecting Anadromous Fish Production

A 15-foot-high drop structure is located near Blossom Hill Road. The District constructed this drop structure to control the bottom profile of the creek and to reduce velocities to protect the streambanks. The District uses this unladdered structure to divert streamflows into percolation ponds as part of its groundwater recharge program. The District is in the process of designing a fish passage facility at this structure; the structure will be laddered by October 1999 as part of a court ordered settlement. Downstream of this structure, the physical barriers that could affect steelhead trout and chinook salmon include the apron and weir at Hillsdale Avenue, and the stream crossing downstream of Ross Creek. The weir at stream gage Station No. 23B was modified in 1995 by the District and successful passage of chinook salmon and steelhead trout has since been documented (Gilroy 1996).

Field surveys conducted to locate potential barriers to fish migration upstream of the Blossom Hill drop structure identified the following potential barriers (see Figure 4.14-3):

- on Alamitos Creek - the gabion structure upstream of Mazzone Drive and stream gage Station No. 16 weir;
- on Guadalupe Creek - Mason Dam, stream gage Station No. 43, and a channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road; and



* Identified obstacle to fish passage.

Figure 4.14-3. Potential Barriers to Fish Migration on Alamitos, Guadalupe, and Arroyo Calero Creeks

- on Pheasant and Shannon Creeks - the culverts under Hicks Road are situated above the elevation of the Guadalupe Creek channel, prohibiting fish from entering these tributary streams. A fish habitat survey of these two creeks has not been conducted, so it is not known if habitat is available.

If the District's Blossom Hill drop structure were laddered as proposed, in combination with removal or modification of the downstream barriers at the apron and weir at Hillsdale Avenue and the stream crossing downstream of Ross Creek, and the identified barriers upstream of the District's drop structure were modified or removed (excluding stream gage Station No. 16), approximately 16 miles of suitable spawning and rearing habitat in the tributary streams upstream of the project area could become available to steelhead trout and possibly to chinook salmon.

Substrate size and quality also can influence salmonid spawning success. As mentioned earlier, adult chinook salmon and steelhead trout require relatively clean gravels in which to lay their eggs. Gravels containing a high proportion of fines (i.e., sand- and silt-sized particles) can affect spawning success by reducing the flow of water (and oxygen) to the eggs in the gravel, thereby reducing hatching success. Furthermore, fine sediments also can reduce or prevent young salmonids from emerging from the gravels after they have hatched. Recent surveys have determined that gravels used by chinook salmon in the Guadalupe River are relatively shallow, contain a high percentage of sand- and silt-sized particles, and may be impairing spawning success (The Habitat Restoration Group 1995).

Low summer flows and warm water temperatures also limit anadromous fish production in the Guadalupe River. Low summer flows limit the amount of habitat available to rearing juveniles and thus can decrease the numbers and biomass of salmonids. Excessive spring and summer water temperatures can influence growth rate, swimming ability, and the ability of salmonids to withstand disease, leading to increased mortality among juveniles.

Other factors affecting anadromous fish common to all populations are natural conditions, such as changing climatic and oceanic conditions, and harvesting. While only chinook salmon are commercially harvested, both chinook salmon and steelhead trout are popular sport fish harvested by anglers. Poaching (i.e., illegal methods of take, harvesting in excess of sportfishing limits or out of season) can also affect anadromous fish populations. Pollutants, commonly contained in runoff of city streets and highways, as well as illegal dumping, and accidental spills of toxic chemicals, can negatively affect fish populations through acute and chronic toxicology.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

Adverse impacts on individuals of species federally listed or proposed for listing as threatened or endangered were considered significant if any of the following criteria were met. Impacts on substantial portions of local populations of federal candidate species; USFWS-designated sensitive species; state-listed endangered, threatened, or rare species, or

species of special-concern; or game species were considered significant if any of the following criteria were met:

- Direct mortality;
- Long-term loss of existing habitat;
- Temporary or short-term loss of habitat that may result in increased mortality or lower reproductive success; or
- Avoidance by fish of biologically important habitat for substantial periods of time (e.g., construction in or adjacent to spawning gravels), which may increase mortality or lower reproductive success.

Impacts were considered less than significant if they would not meet any of the criteria listed above. Beneficial impacts include removal of barriers to migration and changes in stream or percolation pond characteristics that would increase habitat suitability for fish. Beneficial impacts were identified if they were expected to result in an observable change in the abundance or distribution of a native fish species or community.

Construction Impacts

Construction activities associated with the proposed project that would result in adverse and beneficial impacts on fisheries include floodway improvements, bank stabilization measures, and removal of existing barriers to fish passage.

The following assumptions were made regarding construction-related impacts on fishery resources:

- Proposed channel modifications, including the removal or modification of partial and complete fish barriers, would result in a long-term benefit to fisheries resources (particularly anadromous species such as steelhead trout and chinook salmon) by increasing the availability of spawning and rearing habitat for these species. Presently, these tributary streams (i.e., Alamitos, Calero, and Guadalupe Creeks) contain better conditions for spawning and rearing, compared to the Guadalupe River.
- Permanent loss of riparian vegetation from channel widening and bank stabilization activities would result in short- and long-term loss of physical habitat features (e.g., loss of vegetative cover and undercut banks), possibly increasing mean water temperature from loss of shade and reducing habitat complexity.
- The District would limit in-channel construction activities to the summer low-precipitation period (April 15-October 15), with the condition that construction requiring stream dewatering or work in the channel invert not commence until May 1, provided that stream monitoring criteria are satisfied. Should stream monitoring criteria not be met, channel invert work and stream dewatering would not be allowed to commence until June 1. Additionally, the District would require the contractor to implement an erosion control plan. These actions would minimize the potential for

occurrence of temporary increases in turbidity and suspended particles resulting from in-channel construction and nonpoint-source runoff to the river. Limiting in-channel construction activities to the summer low-precipitation period would also minimize impacts on juvenile salmonids and adult fish migrating to upstream spawning areas, especially adult anadromous species such as chinook salmon and steelhead trout.

- The District would require the contractor to implement a hazardous materials control and response plan to minimize the potential for accidental spills of petroleum-based products associated with the operation of heavy machinery.

- No impacts on state-listed or federally listed special-status fish species would occur because no listed species occur in the project area. NMFS has proposed the steelhead trout within Central California Coast ESU as threatened under the federal Endangered Species Act. The "Affected Environment/Setting," (above) and the impacts and mitigation measures, identified below, fully address the potential effects on steelhead trout. This EIR/EIS will be submitted to the USFWS in compliance with the requirements for consultation under the Endangered Species Act for species proposed to be listed.

Operational Impacts

Operational changes that would result in adverse and beneficial impacts on fisheries include operation of bypass channels and changes in vegetation maintenance activities.

The following assumptions were made regarding operational impacts on fisheries:

- The District would design bypass channels that would avoid impacts on fishery resources. Sloping the bypass channel invert toward the west bank would reduce the potential for fish entrapment by creating a low-flow channel that would provide fish with adequate water depths as flows recede. The District would not include design features (e.g., gradient-control structures) in bypass channels that could result in the formation of ponded water habitats with the potential to entrap fish during receding flow events. To further reduce the potential for fish entrapment within constructed bypass channels, the District would submit final design plans for bypass channels to DFG for review.

- The proposed maintenance program incorporates several measures that would protect and enhance the riparian system. This proposed program potentially would increase streamside vegetation coverage and densities, which could result in an increase in the areal coverage and density of SRA cover.

- The District used to operate in-stream percolation ponds in Reach 12 during summer. The proposed project assumes the continued operation of seasonal graded percolation ponds during summer without substantial changes to existing conditions.

Preferred Project

Beneficial Impacts

Increase in Habitat Availability for Migrating Steelhead Trout and Chinook Salmon Resulting from Removing Partial Fish Barriers and Providing Fish Passage at Blossom Hill Drop Structure. Proposed channel modifications include removing an abandoned stream gage, consisting of a concrete apron and weir, at Hillsdale Avenue (Reach 10C) and a low-flow vehicle crossing (ford) downstream of Ross Creek (Reach 11B). Both structures are potential barriers to upstream migration by adult salmon and steelhead trout and require high flows for successful fish passage. Only during peak urban storm runoff or prolonged watershed runoff do existing flows allow successful fish passage. Removing the barriers would improve access for migrating fish from the San Francisco Bay upstream to the drop structure above Blossom Hill Road.

In the past, the weir at stream gage Station No. 23B partially inhibited fish migration because of the design of the structure. Water did not crest over the weir directly into the plunge pool, reducing the effectiveness of the plunge pool. Boulders below the water surface near the weir further reduced passage capabilities by reducing pool depth and passage corridors. The District modified the weir in 1995 and deepened the pool downstream of the weir, thereby creating favorable hydraulic conditions for successful fish passage. As part of the proposed project, the District would lower the gage station to the channel invert. This would further improve passage conditions for migrating adults.

The Blossom Hill drop structure is a barrier to fish migrating to the upper Guadalupe River and tributary streams (i.e., Alamitos, Calero, and Guadalupe Creeks). The District proposes to construct a fishway at the Blossom Hill drop structure as part of the proposed project. In accordance with a September 1995 settlement agreement, the District has committed to constructing the fishway by October 15, 1999 (see "Settlement Agreement" in Chapter 3, "Preferred Project and Alternative"). The fishway will provide access to an additional 2.9 miles of fish habitat from the drop structure to potential fish barriers at Mason Dam on Guadalupe Creek and the gabion structure on Alamitos Creek upstream of Mazzone Drive.

Less-than-Significant Impacts

Fish Passage in Lower Ross Creek. Proposed channel modifications included widening the existing lower Ross Creek channel from Almaden Expressway to 700 feet upstream of Jarvis Avenue and installing RCB culverts at Almaden Expressway and Jarvis Avenue to increase flood conveyance capacity in lower Ross Creek. The District would construct a step pool fish ladder at the mouth of Ross Creek and install Washington-style baffles in the new RCB culverts for future fish passage into Ross Creek. The pools will be temporarily backfilled with rock which will be removed when fishery habitat in Ross Creek improves in the future and DFG concurs in removal of the rock. DFG (Roper 1996) has indicated that anadromous fish migration into Ross Creek should be discouraged. When, and if, the step pool fish ladder is activated, it will eliminate any potential impact of reduced water surface elevations during flooding events as a result of the proposed channel improvements.

Fish Passage Conditions in Canoas Creek. Fish passage conditions in Canoas Creek were not evaluated because habitat within Canoas Creek is unsuitable for salmonid production and DFG has indicated that anadromous fish migration into Canoas Creek should be discouraged. The proposed project would reduce the potential for fish migration into Canoas Creek from the Guadalupe River. Under future (with-project) conditions, the water surface elevation in the Guadalupe River would be reduced during storm events, thereby reducing the incidence and duration of culvert inundation.

Potential for Acute and Chronic Toxicity to Fisheries and Reduced Fish Productivity Resulting from Construction-Related Activities. Activities associated with excavation, channel widening, and bridge replacement and the construction of bypass channels, floodwalls, maintenance roads, and access ramps could increase erosion processes, thereby increasing sedimentation and turbidity in downstream waterways. Excessive sediment quantities deposited in or near stream channels can degrade aquatic habitats. Sediments can smother developing eggs, degrade spawning habitat, and decrease food production. Increased turbidity can increase fish mortality; reduce feeding opportunities for fish, including rearing steelhead trout and chinook salmon; and cause fish to avoid biologically important habitat.

In addition, construction materials, such as concrete, sealants, oil, and paint, could adversely affect water quality if accidental spills occurred during project construction. Increased pollutant concentrations could limit fish production, abundance, and distribution by reducing fish egg survival and causing direct mortality of fish. Steelhead trout and chinook salmon inhabiting the Guadalupe River require relatively clean, cold, well-oxygenated water for successful growth, reproduction, and survival and are not well adapted to survive in degraded aquatic habitats.

Preparation of Storm Water Pollution Prevention Plan. The District would require the contractor to implement a Storm Water Pollution Prevention Plan (refer to Mitigation Measure WQ-1) to minimize the potential for sedimentation of aquatic habitats, including steelhead trout and chinook salmon spawning and rearing habitats. Measures in the plan would include but would not be limited to:

- Conducting all construction work according to site-specific construction plans that minimize the potential for sedimentation of aquatic habitat;
- Identifying all areas requiring clearing, grading, revegetation, and recontouring and minimizing the areas to be cleared and graded;
- Grading spoil sites to minimize surface erosion;
- Avoiding riparian and wetland vegetation, wherever possible, and identifying and fencing specific trees for riparian habitat maintenance (see Mitigation Measure V-4 in the "Vegetation" section);
- Covering bare areas with mulches and revegetating all cleared areas with native species;

- Preventing equipment operation in flowing water when performing in-channel activities by constructing coffer dams and diverting all streamflows around construction sites; and

- Constructing sediment catch basins across the stream channel immediately below the project site when performing in-channel construction to prevent silt- and sediment-laden water from traveling downstream and periodically removing accumulated sediments from the catch basin.

The District would require the contractor to implement a hazardous materials control and spill response plan to reduce the potential for impacts on spawning, rearing, and egg incubation stages of anadromous salmonids. The plan would control the use of hazardous materials, such as petroleum-based products used in heavy equipment and other potentially toxic materials used during construction. Measures would include but would not be limited to:

- Preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;

- Establishing a spill prevention and countermeasure plan before project construction that includes strict on-site handling rules to keep construction and maintenance materials out of drainages and waterways;

- Cleaning up all spills immediately according to the spill prevention and countermeasure plan and notifying DFG immediately of any spills and cleanup procedures;

- Providing staging and storage areas located outside the stream's normal high-water area for equipment, materials, fuels, lubricants, solvents, and other possible contaminants;

- Removing vehicles from the normal high-water area of the stream before refueling and lubricating; and

- Preventing operation of equipment in flowing water.

The District would submit this plan to DFG with its application for a streambed alteration agreement pursuant to Section 1601-1607 of the California Fish and Game Code before construction begins.

This impact is considered less than significant, and no mitigation is required.

Potential Impacts on Fish Migration and Spawning Due to Channel Construction. To further reduce the likelihood of impacts on fish from construction activities, the District proposes to limit in-channel construction (i.e., that occurring between the top of one bank to the top of the opposing bank) to the April 15 to October 15 period. Construction outside this period would require prior approval from DFG. Construction in the channel invert or other

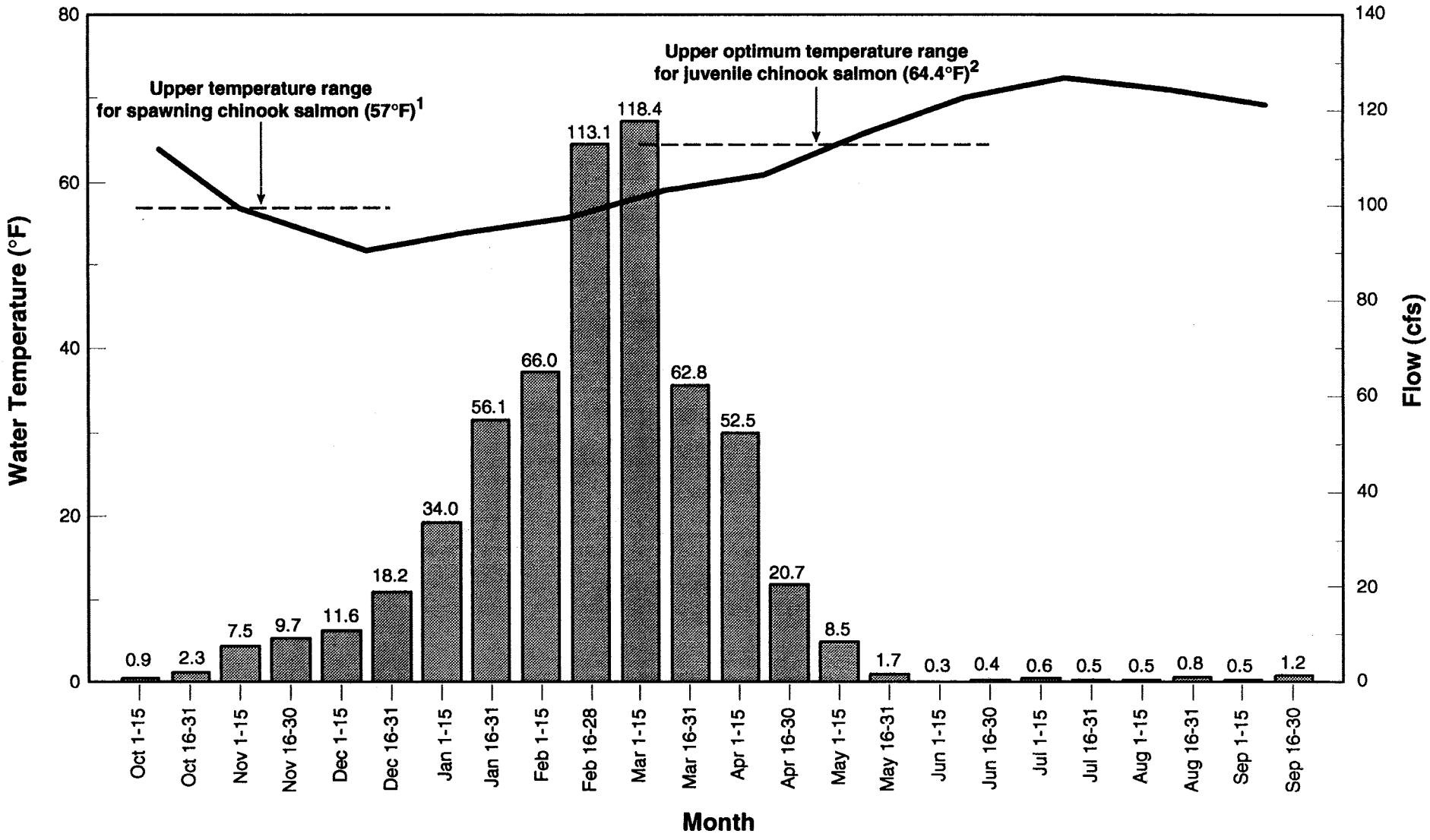
construction activities requiring stream dewatering, heavy equipment operation in the channel, or stream crossings would be limited to the May 1 to October 15 period with the stipulation that such activities can commence before June 1 only if field surveys (consisting of a minimum of 3 days of sampling) indicate that no juvenile salmonids are present in the project vicinity and that average daily water temperatures have exceeded 64°F for a minimum of 3 days in a row (generally, conditions for steelhead trout and chinook salmon decline when water temperatures exceed 64°F in spring).

By limiting construction to the April 15 to October 15 period, the District achieves two goals: limiting construction to periods when migrating and spawning chinook salmon and steelhead trout are less likely to be affected and maximizing the construction period, thereby reducing the number of years required to construct the project (and, specifically, the number of years that potential impacts on all fishery resources would occur).

The proposed construction period, which focuses on protecting migrating and spawning adult chinook salmon in fall and rearing steelhead trout and chinook salmon juveniles in spring, was developed by comparing the known life history and habitat requirements for these species with available streamflow and water temperature data for the Guadalupe River. As stated earlier under "Existing Fisheries Resources," adult chinook salmon enter the lower Guadalupe River as early as June and have been observed in the upper reaches of the river (i.e., the project area) as early as November, when seasonal rains and cooler weather result in improved stream conditions. Measured streamflows and water temperature data further substantiate that optimal conditions for chinook salmon migration and spawning typically do not occur in the project area until November (Figure 4.14-4). Consequently, proposed in-channel construction activities occurring up through October 15 are not expected to affect adult chinook salmon migration and spawning.

Although construction activities in October would not affect adult steelhead trout migration (adults would not be expected to enter the river until December, at the earliest), the potential exists for construction activities occurring in spring to adversely affect steelhead trout migration and spawning, as well as potentially affecting juvenile steelhead trout and chinook salmon rearing and outmigration. Based on a review of Shapovalov and Taft (1954), adult steelhead trout begin migrating up coastal streams in December and continue into May, although the majority of adults typically migrate prior to mid-April. Raleigh et al. (1984) report that optimal conditions for adult migration occur when average maximum water temperatures are between 37.5°F and 64.5°F. Optimal conditions for steelhead trout embryos and smolts occur in the northwest in November at water temperatures below 55°F (Raleigh et al. 1984). For chinook salmon juveniles, optimal conditions for smoltification occur when average maximum water temperatures are between 53.6°F and 64.5°F (Raleigh et al. 1986). In general, conditions for steelhead trout and chinook salmon decline when water temperatures exceed 64°F in spring.

A review of available water temperature data for the Guadalupe River indicates that mean monthly water temperatures for April 1994 and 1995 averaged 61.5°F (Figure 4.14-4) (H.T. Harvey & Associates temperature data [Neudorf 1995]). Based on these data, the optimal water temperatures for juveniles were exceeded in 1994 and 1995 by late-April to



Notes: [1]Reiser and Bjornn 1979
[2]Raleigh et al. 1986
[3] H.T. Harvey & Associates temperature data (Neudorf pers. comm.)

Jones & Stokes Associates, Inc.

Figure 4.14-4
Mean Monthly Water Temperature[3] and Mean Monthly Flow at Gage No. 23B for Guadalupe River (1972-1991)

early-May (Figure 4.14-4). It should be noted that mean water temperatures warmed to 66°F (73°F was the maximum water temperature recorded for the month) in May, despite the higher streamflow conditions and cooler weather that prevailed in spring 1995. These limited data suggest that water temperatures can exceed the acceptable range for salmonid eggs and embryos in March and April, and may create suboptimal conditions for smolts by late-April and early-May.

Because of the variability in environmental conditions from year to year and the lack of a long-term database on Guadalupe River fisheries and water temperature data, it is difficult to accurately predict when conditions in the Guadalupe River become less than favorable for salmonids for any given year. Consequently, the construction period of April 15 to October 15 includes the conditional statements discussed above for in-channel construction activities affecting the channel invert during the April 15 to May 31 period. Adherence to these measures is expected to minimize the potential for adverse impacts on steelhead trout and chinook salmon populations, while also reducing the number of years required to construct the project.

This impact is therefore considered less than significant, and no mitigation is required.

Potential Adverse Effects on Fishery Resources Resulting from Operating Bypass Channels. Implementing the Preferred Project would include constructing and operating an 8,000-foot-long bypass channel in Reaches 6-8 and two separate 500-foot-long bypass channels in Reach 9 (one at Pine Avenue and one upstream of Malone Road). HEC-2 modeling results indicate that the bypass channel in Reaches 6-8 would not begin operating until flows in the natural channel exceed 1,500 cfs. The Pine Avenue and Malone Road bypass channels in Reach 9 would become operational when flows exceed 1,600 cfs and 700 cfs, respectively (Bravo 1993). Although the Malone Road bypass channel would operate more frequently and for longer durations than the other bypass channels, operation of the Malone Road bypass channel would likely have minimal effects on fish spawning and migration because it is relatively short. Operation of the Pine Avenue bypass channel would have the least effect on fisheries of the proposed bypass channels because it is short and would operate less frequently and for shorter duration than the other two bypass channels. The following discussion focuses on the potential effects of operating the bypass channel in Reaches 6-8 because it has the greatest potential for impacts on fishery resources. Each of the following impacts are assessed below and determined to be less than significant:

- Potential for fish entrapment or delays in migration resulting from operating bypass channels,
- Potential for reduced fish migration and spawning success in the Guadalupe River resulting from changes in hydraulic characteristics, and
- Potential for reduced channel maintenance flows and gravel flushing flows.

Potential for Fish Entrapment or Delays in Migration Resulting from Operating Bypass Channels. The potential for delays in migration or entrapment of fish is dependent on a number of variables, such as the length and design of the bypass channel, the frequency and

duration of bypass operation, the coincidence of bypass operation with the migration timing of adult and juvenile fish, and the behavior of adult and juvenile chinook salmon and steelhead trout. Unless an adequate connection to the River at the upstream end of the bypass is maintained, adult chinook salmon and steelhead trout may move into the bypass channel during high flows and experience delays in migration or, worse, become stranded by receding flows. Juvenile outmigrants may also move into the bypass channel during high-flow events in spring and be stranded by receding flows. The formation of isolated pool habitats could increase the potential for fish entrapment during receding flows. Delays in fish migration and fish entrapment would reduce chinook salmon and steelhead trout abundance by increasing fish mortality or lowering reproductive success. Based on the existing flow frequency data and known steelhead trout spawning and migration criteria from the scientific literature, most steelhead trout migration and spawning in the Guadalupe River likely occurs at flows less than 1,500 cfs.

Hydrologic data for water years 1972-1991 indicate that flows equaling or exceeding 1,500 cfs on the Guadalupe River at stream gage Station No. 23B (Reach 10B) occur from November through April (Table 4.14-4). During this period of record, flows equaled or exceeded 1,500 cfs on 45 days; February had the greatest number of days (14), followed by January (13 days), March (10 days), April and November (3 days), and December (2 days). If one considers the peak migration season for adult chinook salmon (October through December), minimal effects on migrating adult chinook salmon from operation of the bypass channel are anticipated. During October through December, flows equaled or exceeded 1,500 cfs (i.e., the minimum flow necessary for bypass operation) on only 5 days combined out of 1,748 possible days (i.e., 92 days in October through December over 19 years).

Although bypass channel operation is more likely to occur in winter during the adult steelhead trout migration period (i.e., December through April), the potential for effects on migrating adult steelhead trout are also anticipated to be minimal because bypass operation would occur infrequently and for short durations. An analysis of daily peak flows determined that during the 1972-1991 period, Guadalupe River flows equaled or exceeded 1,500 cfs on only 42 days, approximately 1.5 percent of the total days occurring during the 6-month rainy season. Most high-flow periods had flows exceeding 1,500 cfs for no longer than 1 day in duration (Table 4.14-4).

The rate at which juvenile fish would be drawn into the bypass channel depends on the population abundance of juvenile fish migrating downstream when the bypass channel is flooded and the relative proportion of Guadalupe River flows entering the bypass channel during a flood event. The greatest potential for juvenile fish entering the bypass channel would occur when peak juvenile migration coincides with floodflows of large magnitude and long duration. Because the bypass channel would operate infrequently and for short durations, it is unlikely that a large proportion of the total juvenile fish population would be drawn into the bypass channel during any given flood event. Furthermore, because the downstream end of the bypass channel would be directly connected with the Guadalupe River, juvenile fish entering the bypass channel would be expected to migrate down the bypass channel and re-enter the River.

TABLE 4.14-4

HYDROLOGY FOR THE GUADALUPE RIVER, WATER YEARS 1972-1991

Water Year	Number of Days with Maximum Flow 0 cfs	Number of Days with Maximum Flow 0-500 cfs	Number of Days with Maximum Flow 500-1,000 cfs	Number of Days with Maximum Flow 1,000-1,500 cfs	Number of Days with Maximum Flow >1,500 cfs	Timing of Flows >1,500 cfs
1972	0	320	0	0	0	
1973	125	114	7	4	2	February 10-11
1974	156	201	3	3	2	December 1; March 1
1975	63	294	7	1	0	
1976	149	217	0	0	0	
1977	335	29	1	0	0	
1978	160	189	9	2	5	January 5, 14, 16; March 4-5
1980	148	203	8	2	5	February 16, 18-21
1981	172	188	1	3	1	January 27
1982	8	338	11	1	7	November 13; January 4-5; March 31; April 1, 10-11
1983	45	278	23	7	12	December 22; January 22-24, 26-29; February 28; March 1, 2, 10
1984	65	294	5	0	2	November 10-11

TABLE 4.14-4 (continued)

Water Year	Number of Days with Maximum Flow 0 cfs	Number of Days with Maximum Flow 0-500 cfs	Number of Days with Maximum Flow 500-1,000 cfs	Number of Days with Maximum Flow 1,000-1,500 cfs	Number of Days with Maximum Flow >1,500 cfs	Timing of Flows >1,500 cfs
1985	300	63	2	0	0	
1986	125	221	10	2	7	February 14-15, 17-19; March 10, 15
1987	49	315	0	1	0	
1988	250	115	1	0	0	
1989	333	31	1	0	0	
1990	106	256	2	0	1	February 16
1991	168	193	2	1	1	March 24
Median[(a)]	149	203	2	1	1	
Average[(a)]	155	201	5	1	3	
Average as Percent of Year	42	55	1	0	1	

Note: Data summarized from stream gage Station No. 23B, located approximately 0.5 miles downstream from the Capitol Expressway Bridge.

(a) Median and average exclude water years 1972 and 1973, which were missing data.

Data Source: Santa Clara Valley Water District.

Entrapment of juvenile and adult fish could also occur during a receding flood event, if ponded water habitats formed and became isolated as the bypass channel drained. Juvenile and adult fish trapped within these ponded areas could experience delays in migration or, worse, suffer increased mortality from predation and desiccation of habitats.

The District's proposed design of sloping the bypass channel invert toward the west bank would reduce the potential for fish entrapment by creating a low-flow channel that would provide fish with adequate water depths as flows recede. The District would not include design features (e.g., gradient-control structures) in bypass channels that could result in the formation of ponded water habitats with the potential to entrap fish during receding flow events.

This impact is considered less than significant because bypass channels would operate infrequently and for short durations and the potential for fish entrapment or delayed migration is slight.

Potential for Reduced Fish Migration and Spawning Success in the Guadalupe River Resulting from Changes in Hydraulic Characteristics. The potential for impacts on spawning and migrating chinook salmon and steelhead trout in main channel reaches depends on several variables, such as the effect of bypass operation on water depths and water velocities in main channel reaches, the frequency and duration of bypass operation, and the coincidence of bypass operation with chinook salmon and steelhead trout spawning and migration periods.

When operational, the proposed bypass channels would reduce the magnitude of existing flows in the affected reaches of the Guadalupe River and could adversely affect adult migration and spawning if flow reductions caused unsuitable hydraulic characteristics (e.g., exceedingly shallow water depths) to occur in the main channel. Adult chinook salmon and steelhead trout require suitable water depths and velocities for successful migration and spawning. Excessively shallow water depths and high water velocities can reduce fish passage capabilities at natural barriers, such as gravel riffles, and unfavorable changes in hydraulic characteristics could reduce the amount of available spawning habitat for adult chinook salmon and steelhead trout.

The potential for impacts on chinook salmon spawning and migrating would be minimal because of the slight probability that bypass operation would occur during chinook salmon spawning and migration (see discussion above under "Potential for Fish Entrapment or Delays in Migration Resulting from Operating Bypass Channels"). Furthermore, bypass channel operation would not affect egg survival for either chinook salmon or steelhead trout because bypass operations would not substantially affect hydraulic characteristics in the main channel during egg incubation periods.

Although bypass operation is more likely to occur in winter during adult steelhead trout migration and spawning periods (December to March), minimal effects on steelhead trout migration in main channel reaches are anticipated because bypass operation would not affect water depths and water velocities when flows are less than 1,500 cfs. Based on the existing

flow frequency data and known steelhead trout spawning and migration criteria from the scientific literature, most steelhead trout migration and spawning in the Guadalupe River likely occurs at flows less than 1,500 cfs.

These impacts are considered less than significant because bypass operation would have minimal effects on water depths and water velocities during chinook salmon and steelhead trout migration and spawning periods. No mitigation is required.

Potential for Reduced Channel Maintenance Flows and Gravel Flushing Flows. Operation of the bypass channel would reduce the magnitude of high flows in the main channel when floodflows are diverted into the bypass channel. This reduction in high flows in the main channel could have secondary effects on channel geometry and gravel quality because of the reduction in the incidence and magnitude of channel maintenance and gravel flushing and sediment transport flows.

Channel maintenance flows and gravel flushing flows are necessary to maintain stream channel and gravel quality (Milhous and Bovee 1977, Rosgen et al. 1986). Changes in sediment load or discharge can result in changes in channel shape, loss of spawning habitat, and loss of cover (Milhous and Bovee 1977). Increases in the width-to-depth ratio of stream channels can degrade fish habitat, such as spawning habitat, and create fish passage problems for migrating species such as chinook salmon and steelhead trout.

Significant reductions of peak flows can also cause sedimentation problems because the size of the substrate material that can be transported through the system is reduced. As flows are reduced, the size of the substrate material that is deposited is also reduced. Fine sediments, such as sand-, silt-, and clay-sized particles, can adversely affect redd construction, egg survival, fry emergence, and food production by filling in the pore spaces in cobble and gravel beds.

The potential for bypass operation to adversely affect gravel flushing, sediment transport, and channel maintenance flows is dependent on how bypass operation affects the magnitude and duration of flows responsible for channel formation. Effective discharge, the flow that just fills a nonincised channel to flood stage with an approximate recurrence interval of 1.5 years, is the flow that determines the channel geometry and is responsible for transporting the largest part of the sediment load over the long term (Andrews 1980, Wolman and Miller 1960 in Rosgen et al. 1986) (Figure 4.14-5). Using the method described by Leopold and Dunne (1978) and streamflow data from Streamgage Station No. 23B provided by the District, an annual-maximum flood series was constructed for water years 1971-1991 to determine the effective discharge. The 1.5-year recurrence interval is considered to be a good estimator of effective discharge (Wolman and Leopold 1957, Dunne and Leopold 1957, and Williams 1960 in Rosgen et al. 1986). However, the 1.5-year recurrence flow from the historical annual-maximum flood series may provide only an approximate estimate of effective discharge because of the effects of urbanization and reservoir operation on Guadalupe River hydrology. Based on the most recent hydrologic data, the 1.5-year recurrence interval flow is estimated to be approximately 1,200 cfs, somewhat lower than the minimum flow (1,500 cfs) required to initiate bypass channel operation. Bypass operation is, therefore, expected to have minimal effects on the magnitude and duration of flows responsible for channel formation.

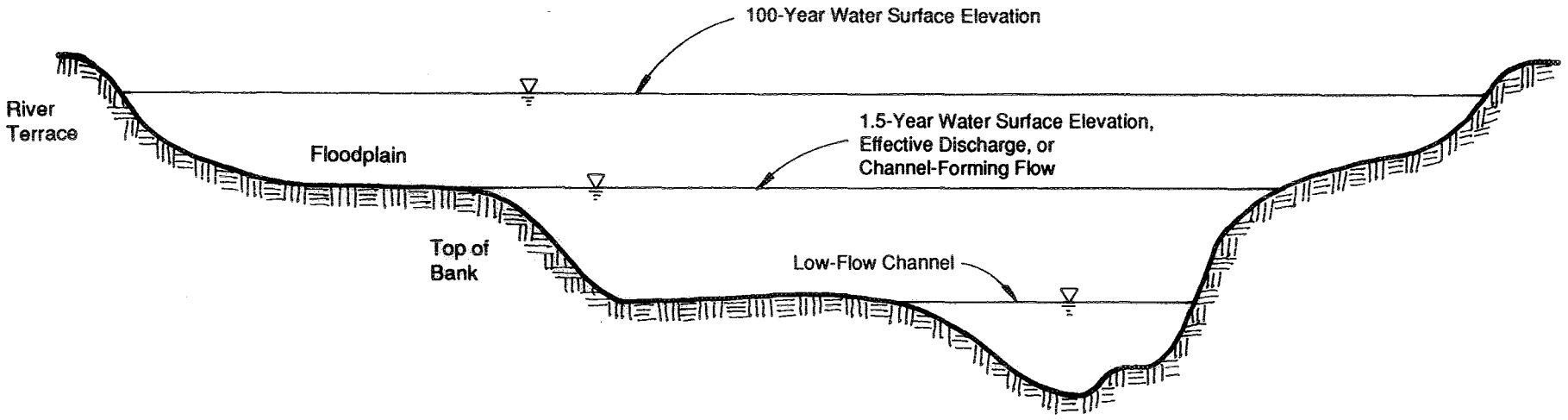


Figure 4.14-5. Typical River Channel Cross Section

Bypass channel operation would therefore not increase the frequency or duration of low- to medium-range flows that could result in an increase in the amount of fine sediments deposited in the main channel. Bypass channel operation would not affect the magnitude or duration of intermediate flows that control channel geometry and transport the largest part of the sediment load over the long term. Potential impacts are therefore considered less than significant, and no mitigation is required.

Reduction in In-Stream Cover and Shade Associated with Periodic Vegetation Removal and Disturbance for Floodway Maintenance. Implementing the proposed maintenance program would result in periodic removal or substantial trimming of riparian plants in the channel bottom, removal of weedy species, application of herbicides on maintenance roads, and trimming of overhanging vegetation to a height of 12 feet along maintenance roads. The proposed maintenance program incorporates several measures that would protect and enhance the riparian system, including (where possible) leaving the bases of native plants in place to allow up to 10 feet of growth until the next trimming and selectively removing non-native trees and shrubs to increase the ratio of native to non-native vegetation.

This impact is considered less than significant because the project would decrease the extent or frequency of vegetation clearing over preproject practices. No mitigation is required; however, the District would implement Mitigation Measure V-2, a vegetation protection plan for riparian and urban forests (refer to Section 4.12, Vegetation). Successful implementation of this measure would reduce the potential of inadvertent impacts and improve the integration of vegetation replacement, enhancement, protection, and monitoring activities with floodway maintenance and management in the project area.

Construction Impacts

Impact F-1: Reduction in Shaded Riverine Aquatic (SRA) Cover Resulting from the Removal of 5,096 Linear Feet of Overwater Vegetation and 1,720 Linear Feet of Undercut Bank along the Guadalupe River. Construction activities associated with grading and excavation of streambanks and bank protection activities would result in the direct removal of overhead cover in the form of overwater riparian vegetation and undercut banks. Removal of this riparian vegetation would reduce existing overhead cover and undercut bank amounts by 5,096 linear feet (28 percent of total) and 1,720 linear feet (15 percent of total), respectively, in Reaches 6-12 of the Guadalupe River. Table 4.14-5 presents affected amounts of overwater vegetation and undercut banks by project reach.

Overhead cover and undercut banks are important SRA cover variables that would be affected by the proposed project. Undercut banks and overhead cover provide fish with cover from predators, and canopy cover (overhanging vegetation) maintains shade for stream temperature control and provides an energy input to the stream in the form of fallen leaves and insects. Riparian vegetation also is important in controlling watershed and streambank erosion and in maintaining undercut banks.

This impact is considered significant because SRA cover is an essential component of salmonid streams. Salmonid populations are highly influenced by the amount of available

TABLE 4.14-5

COMPARISON OF IMPACTS ON SHADED RIVERINE AQUATIC COVER FOR THE PREFERRED PROJECT AND THE MINIMIZE VEGETATION IMPACTS ALTERNATIVE

	Loss of Overwater Vegetation				Loss of Undercut Banks		Loss of Midday Shade	
	Preferred Project		Minimize Vegetation Impacts Alternative		Preferred Project	Minimize Vegetation Impacts Alternative	Preferred Project	Minimize Vegetation Impacts Alternative
Reach	Bank Length (ft)	Stream Area (ac)	Bank Length (ft)	Stream Area (ac)	Bank Length (ft)	Bank Length (ft)	Reduction by Reach Area (%)	Reduction by Reach Area (%)
6	138	0.015	138	0.015	620	620	1.6	1.6
7	562	0.121	562	0.121	600	600	6.3	6.3
8	154	0.027	394	0.069	40	40	4.1	10.2
9	2,027	0.386	197	0.038	350	0	9.6	0.5
10A	700	0.102	48	0.012	110	0	16.0	0.0
10B	0	0.000	0	0.000	0	0	0.0	0.0
10C	535	0.068	254	0.031	0	0	4.9	2.2
11A	323	0.053	162	0.027	0	0	3.4	1.7
11B	381	0.093	459	0.99	0	0	11.5	12.3
11C	276	0.037	276	0.037	0	0	5.8	5.8
12	0	0.000	0	0.000	0	0	0.0	0.0
Total	5,096	0.902	2,490	0.449	1,720	1,260	5.1[a]	4.4[a]

a Overall project average.

cover, and much of the SRA cover in the Guadalupe River has been lost in recent decades as a result of urbanization, roadway and bridge construction, and flood control projects. Without appropriate mitigation, reductions in SRA cover could adversely affect fish production, abundance, and distribution in the Guadalupe River by reducing fish egg survival through increases in water temperature, increasing juvenile fish mortality through decreases in escape habitat, and reducing habitat complexity.

Implementing the proposed project would result in the removal of riparian vegetation, including 5,096 linear feet (28 percent of the total) of overwater vegetation, during construction activities associated with grading and bank excavation. The removal of overwater vegetation would reduce existing shading amounts by an average of approximately 5.1 percent throughout all project reaches and would probably lead to impacts on fishery resources resulting from increases in water temperatures (Table 4.14-5).

Canopy cover maintains shade for water temperature control. Approximately 50 percent to 75 percent midday shade provides optimal thermal regulation for most trout streams (Raleigh et al. 1984). Limited shading can result in water temperatures exceeding the optimal range for salmonids (53°F to 66°F); too much shade can also limit primary productivity in streams. Chinook salmon and steelhead trout are coldwater species sensitive to temperature changes within and above optimal levels. Deleterious water temperatures during spawning, egg incubation, and early-rearing periods can reduce fish survival. Existing water temperatures often exceed optimal levels for chinook salmon and steelhead trout in the Guadalupe River, partially as a result of decreased stream shading.

This impact is considered significant because the existing amount of stream shading is well below the range of 50 percent to 75 percent considered optimal for trout streams and existing water temperatures approach or exceed optimal values for salmonid production. Additional decreases in stream shading would likely result in an increase in water temperatures and contribute to ongoing temperature-related impacts on fishery resources.

Mitigation Measures

Mitigation Measure F-1: Construct Undercut Banks and Replace Loss of SRA Habitat On Site and Improve Fish Passage Conditions on Guadalupe Creek. The District would mitigate construction-related impacts on undercut banks and short-term temperature impacts associated with vegetation clearing during construction by implementing the following specific measures:

Construct 1,720 Linear Feet of Undercut Banks Using Appropriate Techniques Such As Biotechnical Measures and Provide 5,096 Lineal Feet of Overhead Vegetation. In consultation with DFG and USFWS, the District would design and install appropriate revetment materials in association with replanted vegetation to create 1,720 linear feet of undercut bank habitats. This measure would provide for no net loss of undercut banks. Before initiating construction, the existing 1,720 linear feet of undercut banks would be documented in terms of water depths, velocities, and depths of undercut to provide detailed information on existing conditions. Undercut bank mitigation areas would be located in

Reaches 7, 10C, 11A, and 11B. Mitigation areas would be evaluated annually for five years to determine whether created undercut banks are functioning properly by providing habitat conditions similar to those that were measured for existing conditions. If full mitigation cannot be achieved by created banks, the District would consult with DFG and USFWS, initiate remedial actions, and continue monitoring for an additional five years. Remedial actions could include redesign of revetment or other appropriate mitigation based on negotiations with DFG and USFWS.

Mitigation would be considered complete in the fifth year if created undercut bank lengths provide habitat conditions similar to those measured for preproject conditions.

In addition, the loss of undercut banks, overhead cover and stream shading would be reduced by implementing Mitigation Measure V-1, which recommends that the District prepare and implement an integrated vegetation mitigation plan to compensate for removal of vegetation, including SRA habitat. Successful implementation of this measure and proposed reductions in in-channel vegetation maintenance throughout all project reaches, would result in an overall net increase in overwater vegetation, provide for more continuous shading over the entire project area, reduce the impact to a less-than-significant level and be consistent with the USFWS requirement of "no net loss of aquatic habitat values or acreage."

Table 4.14-6 summarizes existing and affected overwater vegetation by reach and post-project revegetation that would result from implementing Mitigation Measure V-1.

In association with replanted riparian vegetation, the District would replace 5,096 linear feet of overwater vegetation. SRA habitat, represented by overhead vegetation and undercut bank in this analysis, is a Resource Category 2 habitat. The USFWS's mitigation goal for a Resource Category 2 habitat is no net loss of linear feet, area, and habitat value. USFWS, in their draft Coordination Act Report, concluded that instream and overhead cover variables should be replaced at a ratio not less than 1:1 in terms of linear feet, area, and habitat value (U.S. Fish and Wildlife Service 1993). Implementing the proposed mitigation measures would result in no net loss of overhead vegetation and undercut bank. Locations of proposed revegetation sites, including SRA cover mitigation sites, are presented in Plates V-41 through V-53 (in Volume II). In combination with proposed improvements to fish passage conditions on Guadalupe Creek (below), these measures will result in a net increase in available SRA habitat.

Implementing these measures would result in a 1:1 replacement of overwater vegetation. USFWS, in their draft Coordination Act Report, concluded that instream and overhead cover variables should be replaced at a ratio not less than 1:1 in terms of linear feet, area, and habitat value (U.S. Fish and Wildlife Service 1993). Locations of proposed revegetation sites, including SRA cover mitigation sites, are presented in Plates V-41 through V-53 (in a separate volume).

TABLE 4.14-6

NET CHANGE IN OVERWATER VEGETATION FOR THE PREFERRED PROJECT AND MINIMIZE VEGETATION IMPACTS ALTERNATIVE (MEASURED IN LINEAR FEET ALONG THE BANK)

			Preferred Project			Minimize Vegetation Impacts Alternative		
Reach	Bank	Overwater Existing Vegetation	Affected Vegetation	Overwater Vegetation Mitigation	Net Change	Affected Vegetation	Overwater Vegetation Mitigation	Net Change
6	East	783	138	0	-138	138	0	-138
	West	896	0	17	17	0	17	17
7	East	1,900	273	987	714	273	987	714
	West	2,266	289	348	59	289	348	59
8	East	625	154	0	-154	154	0	-154
	West	792	0	0	0	240	0	-240
9	East	2,379	1,373	523	-850	0	0	0
	West	3,184	654	815	161	197	0	-197
10A	East	698	681	89	-592	0	0	0
	West	726	19	0	-19	48	0	-48
10B	East	0	0	829	829	0	829	829
	West	0	0	1,351	1,351	0	1,351	1,351
10C	East	820	535	1,181	646	254	0	-254
	West	591	0	416	416	0	416	416
11A	East	481	323	0	-323	162	0	-162
	West	584	0	1,475	1,475	0	1,475	1,475
11B	East	247	194	115	-79	272	0	-272
	West	249	187	897	710	187	897	710
11C	East	246	0	110	110	0	110	110
	West	344	276	0	-276	276	0	-276
12	East	137	0	789	789	0	3,879	3,879
	West	0	0	186	186	0	5,100	5,100
Subtotal	East	8,316	3,671	4,623	952	1,253	5,805	4,552
	West	9,632	1,425	5,505	4,080	1,237	9,604	8,367
Total		17,948	5,096	10,128	5,032	2,490	15,409	12,919

Improve Fish Passage Conditions on Guadalupe Creek. The District would improve fish passage conditions on Guadalupe Creek at:

- Mason Dam,
- Stream Gage Station No. 43, and
- a channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road (Figure 4.14-3).

Fish passage structures would be designed in consultation with DFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained.

Implementation of Mitigation Measure F-1 would provide chinook salmon and steelhead trout access to 2.6 miles of stream habitat upstream of Mason Dam.

The District would implement a two-phase monitoring program of fish passage improvements (i.e., Mason Dam, the Blossom Hill drop structure, and the channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road) to determine the success of the improvements: annual surveys (phase one) to determine whether fish are using the structures and ongoing maintenance surveys in perpetuity (phase two) to ensure that structures are operating as designed. No monitoring of Stream Gage Station No. 43 is proposed because only minor modifications to the weir are needed to improve fish passage, precluding the requirement to build an actual fish passage structure such as a fish ladder. The District would develop an appropriate monitoring program in coordination with DFG and USFWS to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout) at the Blossom Hill drop structure, Mason Dam, and the channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road. Phase one of the monitoring program would commence in the fall following completion of fish passage improvements. Monitoring would be conducted from October 1 to April 30, when migrating adult chinook salmon and steelhead trout are expected to occur.

Potential monitoring activities could consist of visual surveys at improvement locations; carcass, redd, and juvenile surveys in reaches upstream of improvement locations; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol would be developed in consultation with DFG and USFWS and would depend on the opportunities and constraints governed by the local conditions (e.g., high turbidity levels during storm runoff periods may preclude the use of visual observation as a sampling method).

The District would submit an annual monitoring report to DFG for up to five years after completion of fish passage improvements. In addition to formal monitoring efforts, the District would look for indicators of passage problems, such as fish congregating downstream of the ladder or failed attempts by fish to negotiate the ladder during routine and ongoing maintenance practices conducted during phase two (discussed below). If the

objective of attaining fish passage has not been met and is not due to factors beyond the District's control (e.g., drought, natural downstream barriers, or limited number of fish), remedial actions would be initiated and monitoring would continue for up to an additional five years. Remedial actions could include redesign of structural improvements or further negotiations with DFG and USFWS regarding other appropriate mitigation.

This measure would be considered successful when fish passage was documented and no indicators of passage problems were present. After successful fish passage was documented, phase one of the monitoring program would be considered complete.

Phase two of the monitoring plan would include repeated surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishways are free of obstructions and debris that could preclude their normal operation. The District would follow the same maintenance and inspection procedures as outlined in an existing MOU with DFG, and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current MOU requires the District to inspect all fish ladders once every working day and at least once per day during high flow events on nonworking days during the migration season. This phase of the monitoring program would continue for the life of the improvement structure.

Mitigation Measure Cf-1 (Chapter 5, "Cumulative Impacts") requires the District to provide fish passage at the gabion structure on Alamitos Creek, which would provide fish access to an additional 10.68 miles of stream habitat. This measure would increase the availability of habitat by slightly more than what would be potentially affected by the cumulative effects of this project, including other ongoing projects on the Guadalupe River (i.e., State Route 87 and the Corps Downtown Guadalupe River Flood Control Project), which totals approximately 9 miles of river. Successful implementation of Mitigation Measure Cf-1, in conjunction with implementing Mitigation Measure F-1, would provide chinook salmon and steelhead trout access to a combined total of 13.3 miles of additional spawning and rearing habitat. Together, these measures would result in a long-term benefit to the anadromous fishery of the Guadalupe River because of the increase in habitat availability and the anticipated benefits associated with the improved habitat conditions found in these tributary streams.

Residual Impacts After Mitigation

Potential impacts to fishery resources could be mitigated to a level of insignificance by successful implementation of the mitigation measures recommended in this section of the EIR/EIS. Channel improvements with proposed fish passage structures would improve fish migration opportunities in lower Ross Creek relative to existing passage conditions. Channel improvements would reduce the potential for fish migration in Canoas Creek, which provides unsuitable habitat for salmonid production. Removing partial fish barriers would increase habitat availability for migrating steelhead trout and chinook salmon.

Mitigation measures for cumulative impacts on fisheries require the District to provide for fish passage at its drop structure upstream of Blossom Hill Road and Mason Dam on Guadalupe Creek and the gabion structure on Alamitos Creek upstream of Mazzone Drive.

Implementing all required mitigation measures and incorporating the environmental protection measures would result in 18 miles of more suitable upstream spawning and rearing habitat for anadromous fish, resulting in a significant, long-term beneficial impact on fishery resources.

Mitigation Measures V-1 and F-1 require the District to compensate for removal of vegetation and loss of SRA habitat, respectively. Successful implementation of these measures would result in no net loss of overwater vegetation and provide for more continuous shading over the entire project area. In addition, successful implementation of mitigation measures for loss of vegetation would provide a net long-term increase in habitat quality along the Guadalupe River because all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants) would be replaced with native species and a net gain of riparian forest and wetland acreages would result. Educating the community and creekside homeowners about biological mitigation and habitat protection associated with the project would increase the likelihood of successful mitigation efforts for all resources.

Minimize Vegetation Impacts Alternative

Under the MVI Alternative, the following impacts would be similar to those of the Preferred Project:

- Potential for acute and chronic toxicity to fisheries and reduced fish productivity resulting from construction-related activities;
- Increase in habitat availability for migrating steelhead trout and chinook salmon resulting from removing partial fish barriers;
- Potential for fish entrapment or delays in migration from the operation of bypass channels;
- Potential for reduced fish migration and spawning success in the Guadalupe River resulting from changes in hydraulic characteristics associated with bypass channel operations; and
- Potential for reduced gravel quality and abundance resulting from bypass operations that reduce the incidence and magnitude of gravel flushing flows and channel maintenance flows.

The following impacts would be similar to those of the Preferred Project but would be reduced by construction of a bypass channel in Reaches 9-10A and Reaches 10C-11:

- Potential for sedimentation and turbidity; and
- Reduction in in-stream cover and shade associated with periodic vegetation removal and disturbance for floodway maintenance.

Levels of significance and mitigation requirements for the above impacts would be the same as for the Preferred Project. Successful implementation of mitigation measures required for

these impacts under the Preferred Project would also reduce impacts to less-than-significant levels under the MVI Alternative.

The following impact would be substantially different from that of the Preferred Project.

Impact: Reduction in Shaded Riverine Aquatic Habitat by the Direct Removal of 1,260 Linear Feet of Undercut Streambank and 2,490 Linear Feet of Overwater Vegetation. Implementing the MVI Alternative would result in the loss of 1,260 linear feet of undercut streambank and 2,490 linear feet of overwater vegetation. Substantially less undercut banks and shade-generating vegetation would be affected in Reaches 9-10A and 10C-11A under this alternative than would be affected under the Preferred Project (Table 4.14-4).

This impact is considered significant, as described for the similar impact under the Preferred Project. The District would implement Mitigation Measures F-2 and V-1 (see descriptions under "Impacts of the Proposed Project" above). Mitigation Measures F-2 and V-1 would be implemented with a smaller level of habitat development in proportion to the smaller level of impact. Successful implementation of these measures would reduce the impact to a less-than-significant level.

No-Project Alternative

Under this alternative, construction of project facilities would not occur and existing fishery resources would be maintained. Ongoing operations and maintenance procedures of vegetation removal, weed control, and channel clearing as needed for floodflows would continue. The downstream structures would not be modified or removed. Adverse impacts on fisheries associated with the project would not occur. The net long-term beneficial impacts on fisheries would not occur.

4.15 VISUAL/AESTHETIC RESOURCES

Affected Environment/Setting

Methods (Data Collection)

Numerous methods have been developed to characterize the scenic quality of a viewscape and viewer responses to visual resources. Several approaches are currently being used that focus on different visual aspects or issues. One commonly used set of criteria includes vividness, intactness, and unity (Federal Highway Administration 1988, Dunne and Leopold 1978, Jones et al. 1975). These criteria are defined below:

- Vividness is the visual power or memorability of landscape components as they combine in visual patterns.
- Intactness is the visual integrity of the natural and artificial landscape and its freedom from encroaching elements. This factor can be present in urban and rural landscapes as well as in natural settings.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole. It frequently attests to the careful design of individual components in the artificial landscape.
- Visibility and visual dominance of landscape elements are affected by proximity; the closer an object is to the viewer, the more dominant it will appear to be. Also, if an object is higher in elevation than the viewer, it will be visually more important than if it is on the same plane or lower than the viewer. The U.S. Forest Service uses the concept of distance zones, often defined as foreground, middleground, and background (U.S. Forest Service 1974). The size of the zones will vary with the terrain, vegetative cover, and human-made elements.

While spatial relationships are important factors in aesthetic evaluation, the duration of a view also affects its value to the observer. Generally, the longer the period of time involved, the more important the view becomes (e.g., homeowners living adjacent to the river corridor).

Frequency of use and numbers of users are also considerations used to evaluate visual sensitivity. Although the single experience of the individual is important, it is generally the collective experiences of many which determine the value of an aesthetic resource for a community. For example, the aesthetic value of a river corridor increases if the river is observed daily by many commuters.

Although aesthetic preferences may vary for individuals, aesthetic preferences of groups of viewers tend to be fairly uniform (Federal Highway Administration 1988). The viewers can be grouped by the type of activity in which they are engaging. Leisure recreational users tend to be aware of and have high concern for the aesthetic resources of river corridors, while commuters on adjacent roadways generally have a lower level of concern and are not as

sensitive. Certain types of resources and proposed changes to resources may be of particular importance to special user groups such as birdwatchers, creekside residents, or children.

Field visits for the Preferred Project's visual analysis were conducted during summer 1989, summer and fall 1990, fall 1992, and spring 1993. The river was evaluated as a whole; sensitive viewer groups were identified; important viewing locations were pinpointed; and photographs were taken. Three different categories of viewer locations are used to describe the visual resources of the river:

- Within the river corridor: the views from within the river corridor outward to the bank slopes and under the tree canopy.
- Adjacent circulation ways: views from vehicular roadways, bridge crossings, railroad tracks, light rail transit, bicycle trails, and pedestrian pathways.
- Adjacent land uses: observations from the surrounding locality (e.g., residential, commercial, industrial, and agricultural lands; the airport; parking lots; and parks).

Regional Setting

Historically, the Santa Clara Valley's rivers meandered from the surrounding hills through broad floodplains to San Francisco Bay. Agricultural and urban development in recent years have restricted the river channels to narrow bands with the use of levees. The remaining river and riparian corridors have become scarce and are important visual resources.

The Guadalupe River flows approximately 21 miles in a general northwesterly direction from its headwaters in the Santa Cruz Mountains to the southern end of San Francisco Bay. Most of the River flows through the broad and heavily urbanized Santa Clara Valley, which is flanked by the rolling hills and mountainous terrain of the Diablo Range to the east and the Santa Cruz Mountains to the west. The hills and mountains are generally undeveloped and provide a vivid backdrop for views from the valley.

The meandering riparian corridor of the Guadalupe River contrasts strongly with the more rigid grid of the urban landscape. The course of the Guadalupe River and its environs have been altered by extensive urban development and flood control measures. The river channel is presently narrow and mostly channelized through the valley. In some areas, it is devoid of vegetation. What remains of the original riparian corridor is an important visual resource of the Santa Clara Valley.

Local Setting

In order to provide a context for describing visual quality, this analysis divides the river corridor into zones distinguished by common visual character (Figure 4.15-1). The visual character zones are described below.

In the northernmost (downstream) portion of the project area, Reach A is bordered by San Jose International Airport, State Route (SR) 87, Interstate (I) -280, and I-880. This reach has a wide river channel and dense understory vegetation with a scattered tree canopy. The corridor is highly visible to users of the freeways, airport, and the levee maintenance roads.

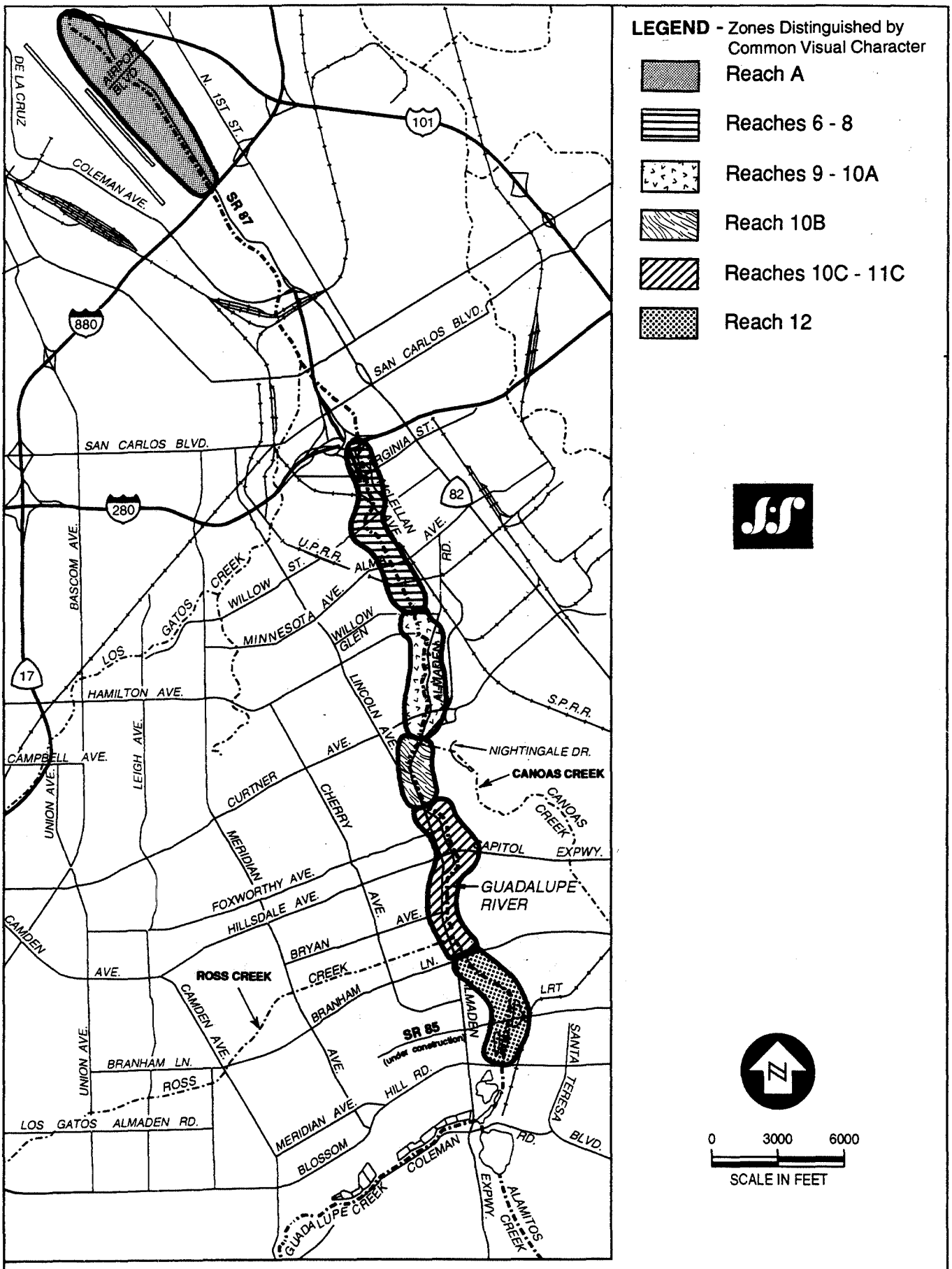


FIGURE 4.15-1. VISUAL CHARACTER ZONES
Guadalupe River Flood Control Project

Reaches 6-8 have common characteristics of narrow, steep-banked, natural-looking channels; mature riparian vegetation; and close proximity to established residential neighborhoods. Reaches 9 and 10A are characterized by a predominantly natural-looking riparian corridor, bordered by both residential and commercial development. Reach 10B has been widened and stripped of mature riparian vegetation. Reaches 10C, 11A, 11B, and 11C are characterized by a wide channel with sparse groupings of mature riparian vegetation, bordered by both residential and commercial development. Reach 12 is vegetated with sparse groupings of mature trees; has a wide channel; and is bordered by agricultural lands, District percolation ponds, commercial properties, and some residential development.

Ross Creek and Canoas Creek are both tributaries of the Guadalupe River. They are narrow, straight channels with minimal riparian vegetation, bordered by residential development.

Reach A: Highway 101 to Interstate 880

Reach A of the Guadalupe River is a wide river corridor that has been channelized for flood control. The San Jose International Airport is situated on both sides of the River. The airline terminals and much of the parking are west of the River; additional parking is northeast. This reach is also bordered by three freeways: Highway 101 forms the northern boundary, I-880 the southern boundary, and SR 87 parallels the River corridor along the southeast. No obstructions block views of the riparian corridor from the surrounding, highly populated land uses; thus, this a very visible reach to the general public.

The northern portion of this reach is characterized by dense riparian vegetation with groves of large cottonwoods. The concentration of cottonwood groves increases toward Airport Parkway Bridge. These trees are important visual elements in views for motorists on Airport Boulevard.

The southern portion of Reach A, also visible to motorists along Airport Boulevard, is characterized by sparse ruderal vegetation and scattered trees. Mature, non-native street trees occur along the tops of the banks, with native vegetation on the midbanks and in the channel. This sparsely vegetated segment of the River corridor contrasts with the tall trees planted along the tops of the banks.

River Corridor. The western river bank is steep, making accessibility to the corridor bottom difficult. The eastern bank is also steep, with a midlevel bench throughout most of the reach. Maintenance roads are on the tops of both banks. These roads provide river access for District maintenance personnel and a large number of pedestrians and joggers. High levels of recreational use were observed during early morning, midday, and early evening periods. The eastern bank appears to be more heavily used than the western bank.

Views of the river corridor from the access roads are expansive. The view from the east levee maintenance road, to the west, includes rows of tall, narrow street trees on the west bank, which provide strong vertical middleground elements. The tree rows screen the airport from most east bank viewpoints. Near Highway 101, the airport parking lot is clearly visible from the eastern bank.

Adjacent Circulation Ways. Highway 101 is a heavily traveled freeway that crosses the River at the northern boundary of Reach A. Motorists on Highway 101 have views of the San Jose International Airport, the linear river corridor, and the airport parking lots. The form, line, and color of the riparian corridor contrasts with the surrounding development to create a vivid image for motorists.

Travelers on SR 87 have foreground views of a linear, 2-mile stretch of mature street trees along the west side of the highway (the east river levee). This vegetation provides a linear visual element that screens views of the airport and parking lots from the motorists. Views into the river corridor are also obstructed by these trees.

Motorists on I-880, a heavily traveled freeway that crosses the River at the southern boundary of Reach A, have views of the river corridor and surrounding development. The vegetation in and around the River contrasts with the nearby hardscape (hard surface) to create a vivid image for the motorists.

Airport Boulevard, the airport perimeter roadway, parallels the west bank of the river corridor. Occasional expansive views of the River are possible from this roadway. The northern portion consists of a wide, open channel with dense clusters of vegetation. The river corridor is highly visible to motorists on this roadway. Its soft lines contrast dramatically with the hard lines of the adjacent asphalt airport parking lots. Mature coast redwood, California pepper, and eucalyptus trees extend along the west bank from the airport entrance to Airport Parkway Bridge, providing a finely textured foreground that frames the riparian view. This southern section of Reach A is also used by a large number of recreationists.

Aerial views of the River from low-flying aircraft are also possible. Arriving and departing flights into San Jose International Airport offer views of the Santa Clara Valley to a large number of travelers. The meandering river corridors of the Guadalupe River, Coyote Creek, and Los Gatos Creek contrast with the angular lines of the city, creating prominent visual features in the urban landscape.

Adjacent Land Uses. San Jose International Airport is the major land use adjacent to Reach A. Asphalt parking lots are situated on either side of the River. Views to the east from the airport terminal include various airport facilities, street trees, and riparian corridor vegetation. Riparian vegetation forms the background of the views.

Several office buildings and a hotel located east of SR 87 have views toward Reach A. From these buildings, the street trees between the river corridor and the highway serve as a soft background contrasting with the stark lines of the highway in the middleground. These trees screen views of the airport parking lots east of the corridor as well as the riparian corridor itself. Scattered views of the taller riparian trees, mainly the cottonwood groves, are visible above the street trees.

Reach 6: Interstate 280 to Southern Pacific Railroad Tracks

Reach 6 is a densely vegetated, relatively narrow river corridor with steep banks. This reach is characterized by a continuous closed tree canopy. Within the corridor, tall cottonwoods

and eucalyptus visually dominate. Mature street trees line the top of the eastern bank along McLellan Avenue.

In the older residential neighborhood, the riparian corridor provides a natural-appearing background for backyards, front yards, and neighborhood streets. The Light Rail Transit (LRT) line and SR 87 parallel the western river bank; thus, large numbers of commuters have views of the riparian corridor (Figure 4.15-2).

River Corridor. The naturally steep banks of Reach 6 prohibit easy access to the river channel. The dense riparian vegetation throughout the reach and the mature, neighborhood street trees along the top of the bank provide a dense shade canopy. Leaf litter and a wide variety of understory vegetation types add to the color and textural diversity of views in the channel. Sacked concrete slope protection south of the Virginia Street Bridge extends approximately 600 feet along the east bank, disrupting the unity of views in this area.

At the southern end of Reach 6, the Southern Pacific Railroad (SPRR) overcrossing creates a break in the viewshed of the riparian corridor. Accumulated trash within the corridor is a negative element in the aesthetics of the viewshed.

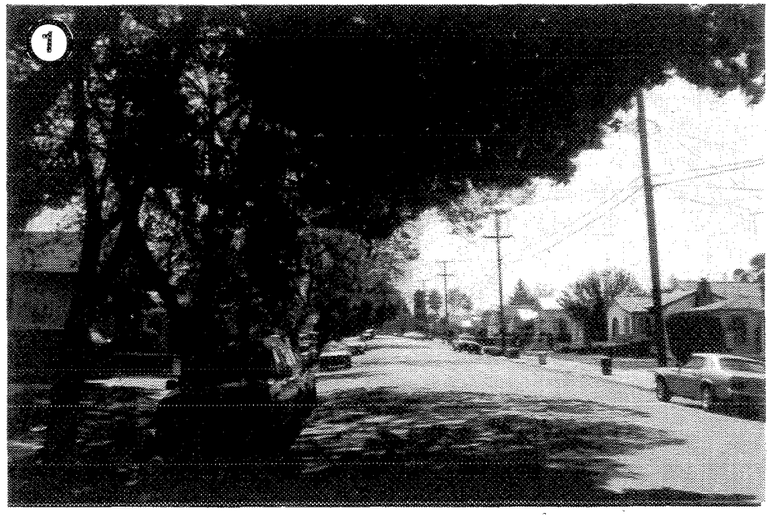
Adjacent Circulation Ways. I-280, the northern border of Reach 6, is a major highway carrying large volumes of traffic. The dense tree canopy of the River is visible to motorists exiting I-280 on the Vine Street off-ramp. The thick vegetation of the corridor contrasts with the hard lines of the interstate, creating a vivid viewshed.

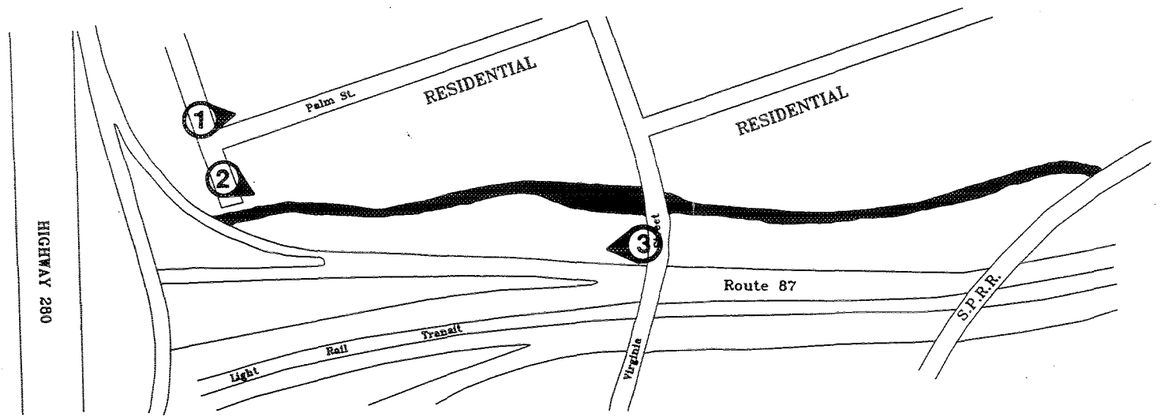
McLellan Avenue, a two-lane residential roadway, parallels the eastern bank of the River. Foreground views of the Reach 6 river corridor can be seen from this road. McLellan Avenue is a quiet, tree-lined street with an enclosed feel that is enhanced by the adjacent mature riparian vegetation.

Palm Street and Harliss Avenue are additional two-lane residential roads bordering Reach 6. Unlike McLellan Avenue, these roads have homes on both sides. An enclosed feel to the neighborhoods is created by the residential landscape combined with the mature riparian trees visible above the roofs of homes adjacent to the River.

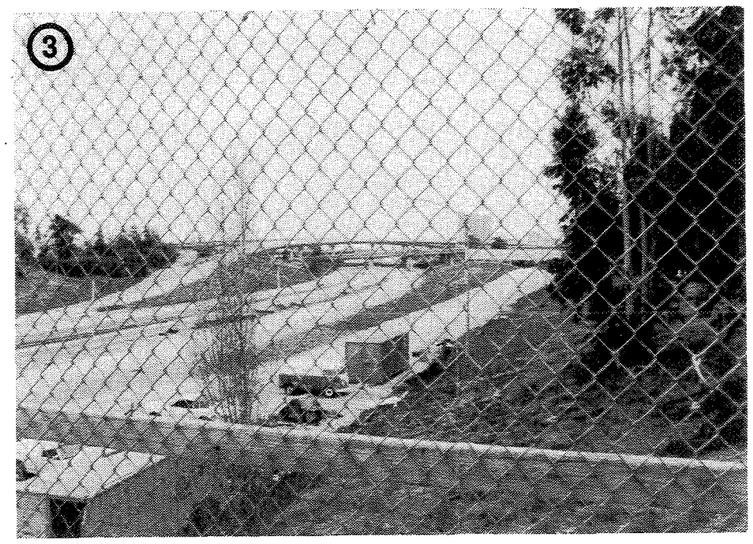
At West Virginia Street, the River veers slightly west, away from McLellan Avenue, creating a wide area on the top of bank along the roadway. Trees growing along the edge are sparse and have some associated understory shrubs. This roadway shoulder is frequently used by pedestrians, cyclists, and joggers. From the southern end of McLellan Avenue, the hard lines of the SPRR overcrossing and the overcrossing of SR 87 and the Light Rail Transit (LRT) are visible.

SR 87 and the LRT constitute an important commuter corridor connecting the surrounding suburbs with San Jose's downtown business district. The newly constructed SR 87 and LRT tracks parallel the west bank of the river corridor. At Virginia Street, the top of the west bank of the River drops steeply to the Virginia Street LRT Station below. Toward the southern end of Reach 6, SR 87 and the LRT cross to the east side of the River. The tall line of cottonwoods becomes visible to commuters as the highway and the LRT climb before crossing the River. Reach 6 can also be seen from the Virginia Street LRT Station west of









Upper Guadalupe River Flood Control Project

Figure 4.15-2.
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Reach 6

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the river corridor. The riparian corridor is an important visual element for commuters because it contrasts with the surrounding urban development.

The Virginia Street Bridge is a narrow, two-lane bridge. Views from this bridge include those of the dense riparian vegetation. The bridge is a major pedestrian access route for users of the Virginia Street LRT Station. The tall cottonwoods of the west bank contrast with the bridge to create a vivid viewshed for westbound traffic.

The SPRR is the southern boundary of Reach 6. Train passengers get brief, high-quality views of the riparian vegetation within the river corridor.

Adjacent Land Uses. The major adjacent land uses in Reach 6 are a residential development on the east side of the River and SR 87 on the west. Foreground views of the riparian corridor are possible from the residences along the east side of McLellan Avenue. Some residences on Palm Street and Harliss Avenue have foreground views of the riparian corridor, but most have background views. The many varieties of trees provide visual interest, with their seasonal changes of color and texture. Views for commuters were discussed above.

Reach 7: Southern Pacific Railroad Tracks to Union Pacific Railroad Tracks

Reach 7 is a predominantly straight, narrow corridor with a closed overstory canopy throughout much of its length. There are a few locations along the east bank where riprap and bare earth can be found. The SPRR overcrossing forms the northern boundary of the reach. The UPRR tracks form the southern boundary of the reach and cross the River south of the Elk's Lodge parking lot (Figure 4.15-3).

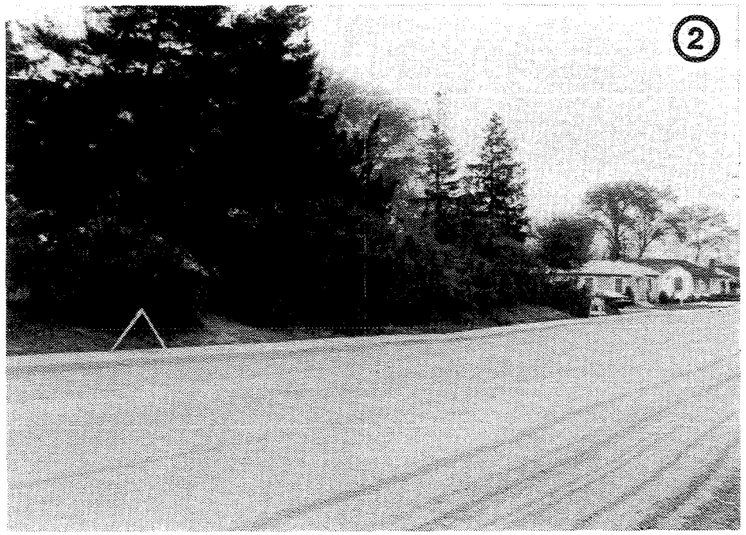
River Corridor. Public access is limited in Reach 7. From the west bank, the dense tree canopy along the River is visible over neighborhood backyard fences along Minnesota Avenue. Views of the corridor are also possible through the chain-link fencing along the River's east bank. Although residential views of the river corridor are somewhat limited, the dense overstory contributes to the neighborhood's aesthetic character. A narrow trail runs along the top of the east bank, inside the Elk's Lodge fence. This trail is occasionally used by pedestrians to reach West Alma Avenue.

Adjacent Circulation Ways. Views of the River are possible from the SPRR overcrossing at the northern boundary of the reach. In the northern portion of Reach 7, SR 87 and the LRT cross the Guadalupe River. The riparian corridor can be viewed from these transportation routes. The Alma Avenue LRT Station is on an elevated platform from which panoramic views of the riparian corridor are possible. Prolonged viewing times are possible for commuters awaiting the arrival of trains. The tall riparian vegetation is an important visual element in these views because it contrasts with the surrounding urban development.

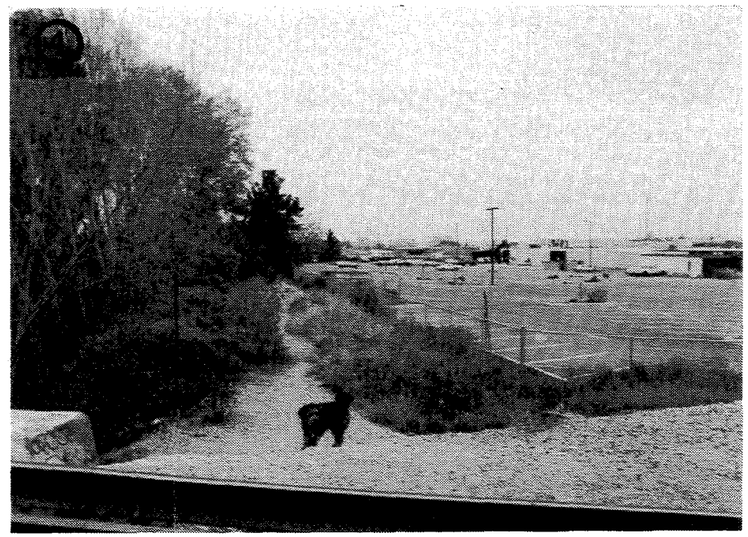
From Willow Street Bridge, pedestrians and motorists have foreground views of the River and surrounding riparian vegetation. The seasonal variety of color and texture contrasts with the static human-made structures, creating a vivid view.

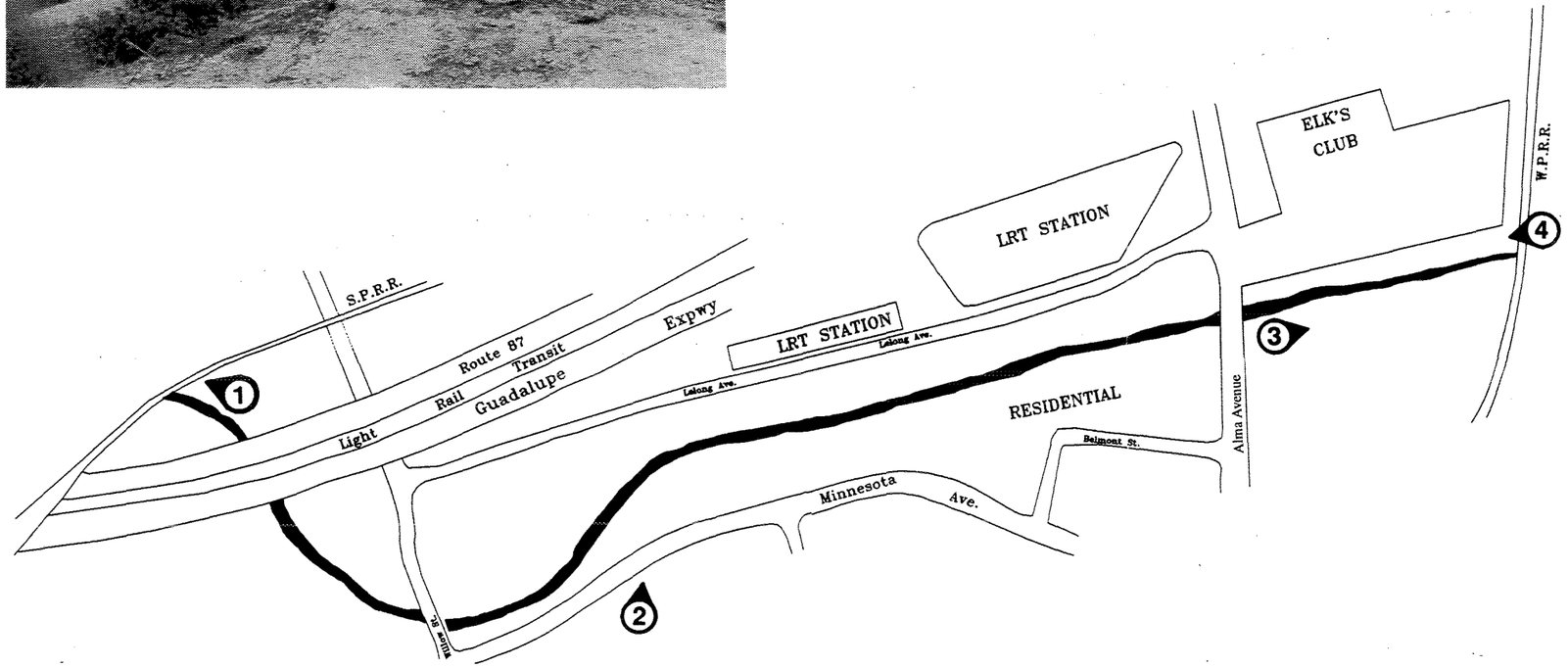
West Alma Avenue Bridge is moderately busy with vehicular traffic. Westbound travelers have unobstructed views of the River that extend across the parking lot of the Alma Avenue











Upper Guadalupe River Flood Control Project

Figure 4.15-3.
Visual Documentation for
Reach 7

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paved surfaces. The West Alma Avenue Bridge also receives moderate to heavy pedestrian use because of the proximity of residential areas, businesses, and the LRT station. Pedestrians on the bridge have views of the riparian vegetation on both banks and clear views of the river channel. The large number of pedestrians using Reach 7 increases its visual sensitivity.

Residents and motorists on the residential streets of Minnesota Avenue and Belmont Street have limited views of the riparian vegetation above the rooftops of the houses adjacent to the River.

The UPRR crosses the River at the southern boundary of Reach 7, just south of the Elk's Lodge parking lot. Train passengers have brief, high-quality views of the riparian vegetation within the river corridor.

Adjacent Land Uses. A residential neighborhood, a community garden for seniors, and the Heflin Business Park are located on the west bank. From these locations, a dense canopy of tall riparian trees can be seen. The vegetation along the corridor, visible above the fences, forms a backdrop to the residents' backyards and the community garden.

The Alma Avenue LRT Station and its parking lot adjacent to the west bank constitute a major public vantage point to the river corridor. Views from this location were discussed above.

The Elk's Lodge borders the east side of the River between West Alma Avenue and the UPRR. Unobstructed views of the dense riparian vegetation are possible from the parking lot. The flat, monochrome parking lot is softened by the backdrop of mature riparian vegetation.

Reach 8: Union Pacific Railroad Tracks to Willow Glen Way

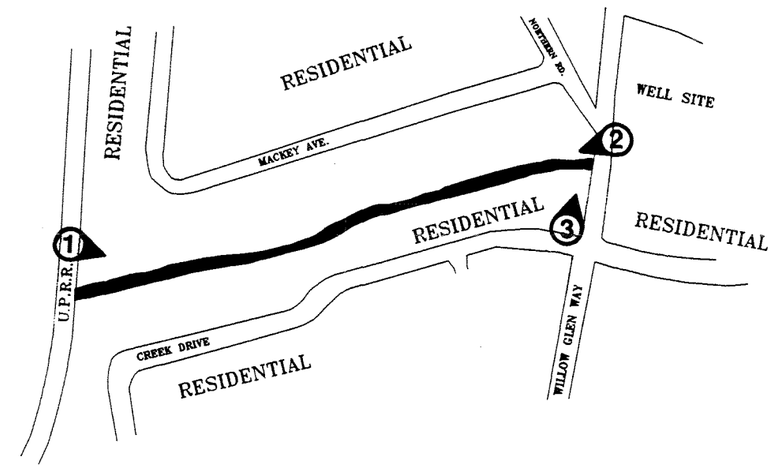
Reach 8 is a short, straight channel with a dense, mature, riparian tree canopy. Surrounded by housing tracts, this reach is viewed primarily by adjacent residents (Figure 4.15-4).

River Corridor. Pedestrian access to the River is limited because of the steepness of the banks and dense vegetation. Views are possible from narrow paths at the top of both banks.

Wooden and chain-link backyard fences line both sides of the river corridor. From these backyards, the large trees of the closed riparian canopy can be seen. West bank residents have access to the river corridor and incorporate the overhanging riparian canopy into their backyards. Decks and treehouses constructed near the edge of the corridor indicate that the River is an important resource to these residents.

Adjacent Circulation Ways. Direct views of the Reach 8 corridor from adjacent roadways are not possible except from the Willow Glen Way Bridge, which is the southern boundary of the reach. The Willow Glen Way Bridge is an old, narrow, two-lane bridge. The narrow structure slows traffic, so motorists have slightly extended viewing times of the corridor. The dense tree canopy creates an enclosed feel in the viewshed. The slope of the west bank,









Upper Guadalupe River Flood Control Project

Figure 4.15-4.
Visual Documentation for Reach 8

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north of the bridge, is lined with sacked concrete. The concrete sacks do not detract from the intactness of the view because: 1) they were placed around the existing tree trunks; 2) they are layered with leaf litter; 3) they were installed on the natural slope; and 4) they have rounded lines which, when combined, blend them into the landscape. The east bank slope contains many understory plants.

Views of the tall riparian vegetation can be glimpsed over the rooftops along Mackey Avenue and Creek Drive, residential streets adjacent to the River.

Background views of the riparian vegetation are possible to travelers on the elevated SR 87 and LRT routes. The riparian corridor within the SR 87/LRT viewshed provides a subtle backdrop for the motorists and commuters, especially interesting as seasonal changes affect foliage colors and textures.

Adjacent Land Uses. The adjacent land use of Reach 8 is single-family housing, with backyards bordering the River. Greater interface of River and suburban areas was observed on the west bank than on the east bank. Views were described above.

Reach 9: Willow Glen Way to Curtner Avenue

Reach 9 is the most visually representative of a natural riparian corridor within the project. Accessibility to the water is difficult because of steep banks, limiting the possibilities of views within the corridor; however, public access to the edge of the corridor is extensive. The River corridor is narrow in the northern portion of Reach 9 and has tall riparian vegetation. Mature specimens of native oak, sycamore, and walnut trees are visible. Tall cottonwoods grow along the east bank in the southern portion of Reach 9 (Figure 4.15-5).

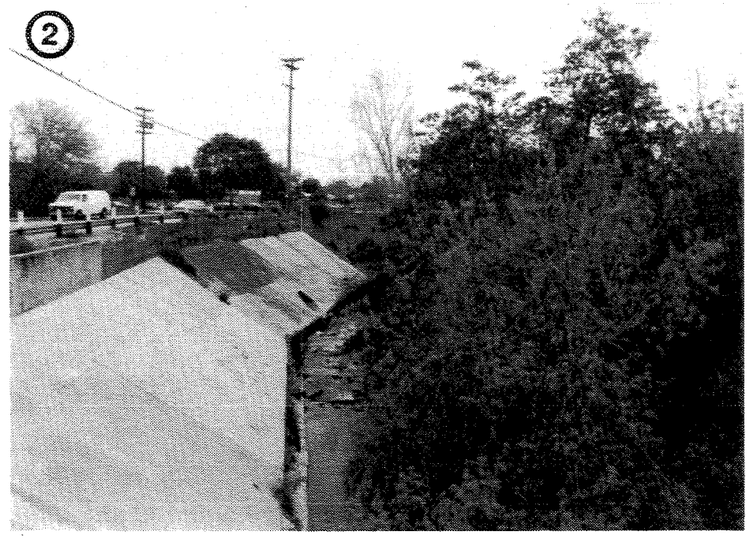
River Corridor. The riparian vegetation is an important visual resource for the residents in this reach. Visible from within the corridor are chain-link and wooden fences of the neighborhood backyards. Some residents use the riparian corridor as extensions of their backyards. West bank residents appear to extend their yards into the corridor more than east bank residents.

Views of this reach upstream of Willow Glen Way to Almaden Road are limited because of the absence of roads directly adjacent to this reach. Commuters on Almaden Road downstream of Curtner Avenue have views of the river corridor.

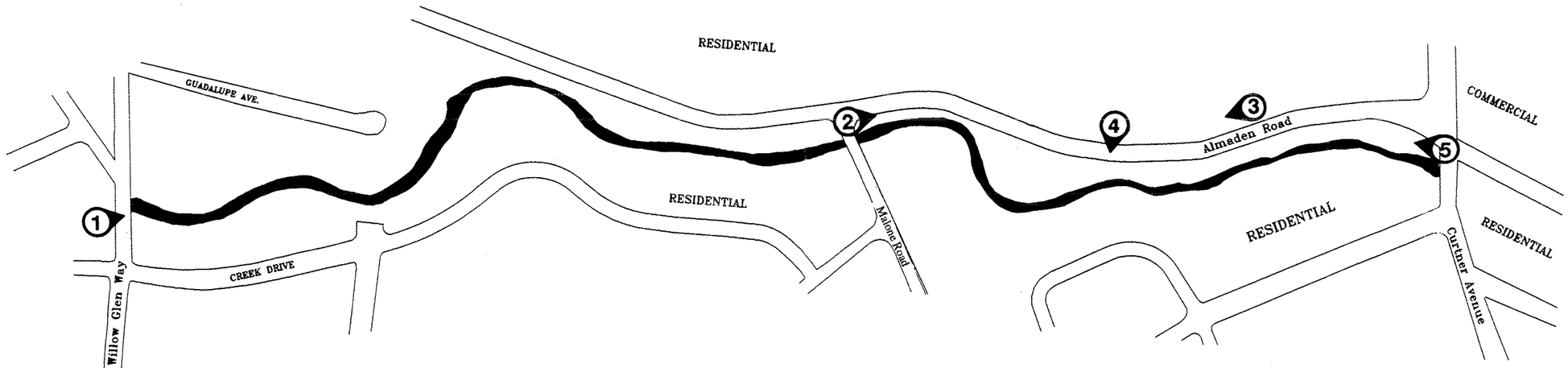
Adjacent Circulation Ways. Riparian vegetation growing along the east bank and the top of the west bank of Reach 9 can be viewed south of the Willow Glen Way Bridge. Adjacent to and parallel with the Willow Glen Way Bridge is a very narrow pedestrian suspension bridge from which a close-up view of the River is available. Looking south, a dense overstory canopy can be seen in the corridor as it curves out of view. Of particular note are the large number of concrete sacks that line the west bank. They blend into the landscape for the same reasons mentioned in Reach 8 for the sacked concrete located north of the bridge.

Views of the River through a chain-link fence are possible from the west bank of the River, where Pine Avenue ends. The dense riparian forest on the east bank is comprised primarily

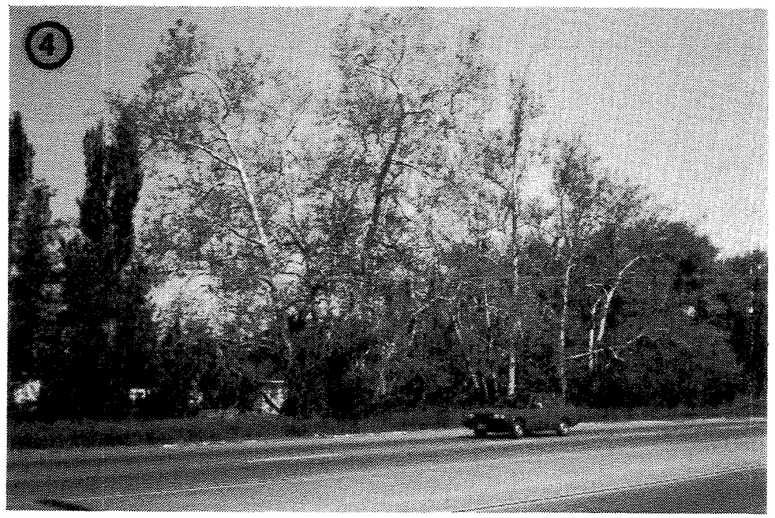












Upper Guadalupe River Flood Control Project

Figure 4.15-5.
Visual Documentation for
Reach 9

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of large cottonwoods and sycamores. From this location, the gently meandering, wide-banked River, flanked by mature riparian trees, is moderately vivid.

The Malone Road Bridge is located midreach. From this bridge, several mature oaks and sycamores are visible along the east bank. Cottonwoods can be seen growing at the toe of the west bank. The unity of the view north from the Malone Road Bridge is disrupted by the lack of mature riparian vegetation. This vegetation was removed during reconstruction of the bridge. The disturbed area has been replanted with young trees.

From Creek Drive, Ardis Drive, and Guadalupe Avenue, the tall riparian vegetation is visible above the rooftops. From this perspective, the riparian vegetation blends with the mature residential landscaping. Roads and homes obscure views of the river corridor, allowing only glimpses of the treetops.

South of Guadalupe Avenue, motorists along Almaden Road have views of the dense, mature riparian vegetation of the river corridor. Adjacent light industrial land uses contrast with the riparian vegetation in this view. Concrete lining on the east bank near the middle of the reach is devoid of vegetation, contrasting with the lush foliage upstream.

Curtner Avenue is the southern boundary of Reach 9. This bridge over the River provides another vantage point from which to view the interior of the riparian corridor. The east bank north and south of the bridge is being retained with vertical concrete walls. Vegetation on the west bank, in the river corridor, and on the top of the east bank is mature and the canopy is closed. This vegetation screens the concrete walls, giving unity to the views. Traffic on Curtner Avenue is moderately heavy and likely to increase with improvements to the nearby LRT station.

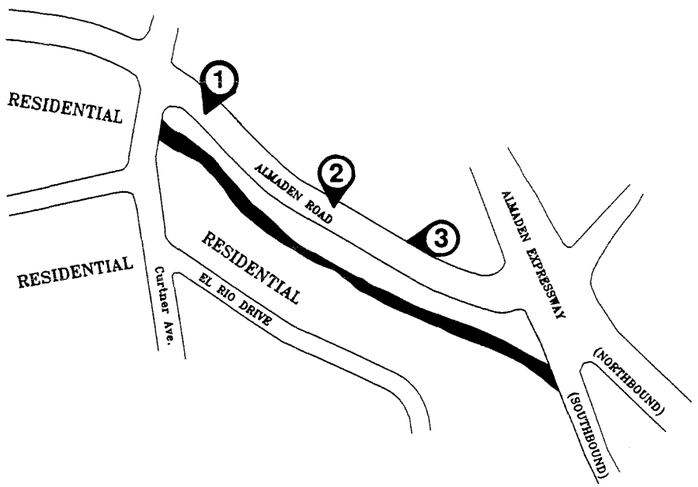
Adjacent Land Uses. Single-family residences line the entire west bank and a portion of the east bank of Reach 9. Some of the residents have incorporated the river corridor into their backyard living space. Many of the backyards along the west bank have unobstructed views of the mature riparian vegetation. The overstory canopy combines with the backyard landscaping to create an enclosed quality for these yards, while still permitting views of the opposite bank.

A San Jose Water Company (SJWCo) well field is located on the east bank at Willow Glen Way. The view is comprised of dense riparian vegetation visible beyond the locked chain-link fence of the well field. The barren field and equipment contrast with the thick vegetation in the River, reducing the view's unity.

Reach 10A: Curtner Avenue to Canoas Creek

The general character of the northern portion of Reach 10A is similar to the Reach 9 section along Almaden Road. This reach is predominantly a narrow corridor with mature riparian vegetation growing in fairly dense stands. Most public views are available from Almaden Road and the adjacent Almaden Shopping Center (Figure 4.15-6).









Upper Guadalupe River Flood Control Project

Figure 4.15-6.
Visual Documentation for
Reach 10A

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River Corridor. Steep banks throughout Reach 10A prohibit easy access into the river corridor. Public use of the tops of banks is also limited because of the narrow roadway shoulder of Almaden Road on the east bank and private property on the west bank.

Views of the corridor for adjacent residents are typically open, although some are partially obstructed. On the west bank, adjacent residents have constructed decking and benches and placed chairs near the edge of the corridor to maximize their views of the river channel. The unique forms of the mature riparian vegetation provide a vivid viewshed for west bank residences. The dense vegetation on the east bank also screens views of the Almaden Shopping Center.

Canoas Creek marks the southern boundary of Reach 10A. Its confluence with the Guadalupe River is just south of the northbound bridge of the Almaden Expressway. Limited access prohibits viewing of this area.

Adjacent Circulation Ways. Almaden Road closely parallels the top of the east bank and its lack of sidewalks on the west side of the road discourages pedestrian use of that side. The road merges into Almaden Expressway at the southern boundary of the reach. The northbound and southbound bridges of the Almaden Expressway cross the River at this location.

Motorists on Almaden Road have foreground views of the riparian corridor in Reach 10A. The dense vegetation contrasts with the paved shopping center on the east side of the road, detracting from the intactness of this view.

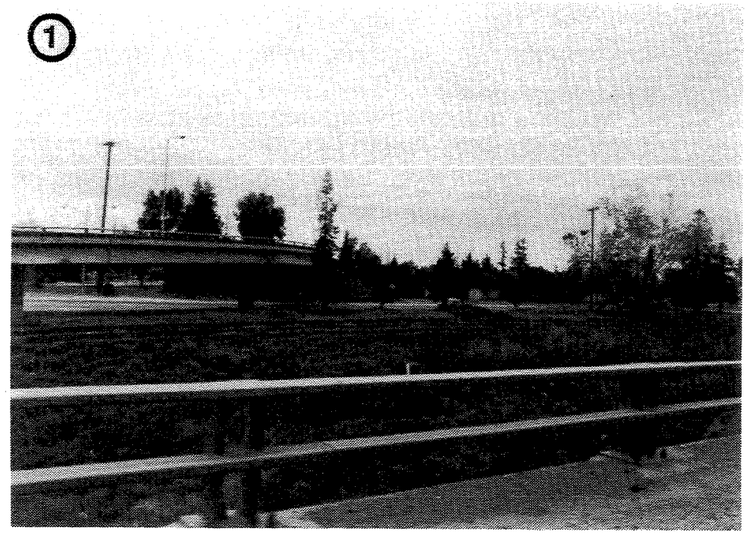
Adjacent Land Uses. Willow Glen Shopping Center is located east of Almaden Road. Outdoor seating is available to customers of the McDonald's restaurant in the shopping complex, allowing for prolonged viewing times. The bold forms of some of the riparian trees create a vivid view for outdoor diners.

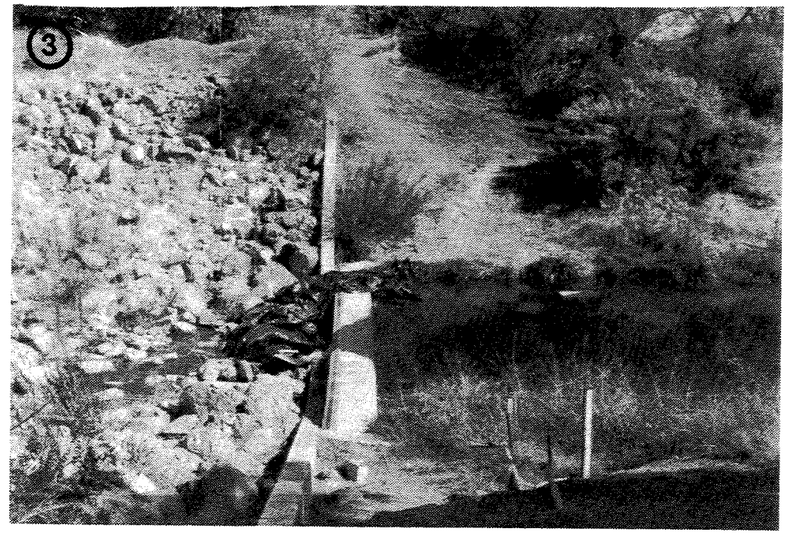
West bank homes, which do not abut the River, have limited views of the tops of the cottonwoods that flank the River. From El Rio Drive and other side streets, the riparian corridor is not clearly discernible, but the tall vegetation forms a soft backdrop for homes along the River.

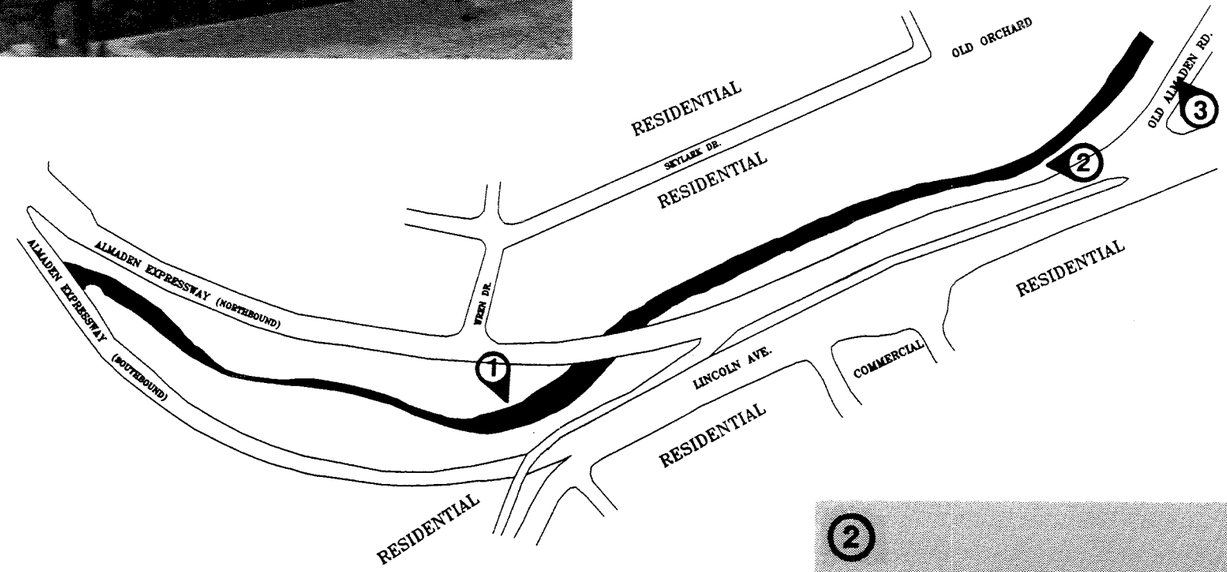
Reach 10B: Canoas Creek to Stream Gage Station No. 23B

Reach 10B is a wide channel that has been altered by flood control measures. This section lacks shade canopy in the channel; however, a few scattered riparian trees are growing on the tops of the banks. Almaden Expressway, a busy arterial with three lanes of traffic both northbound and southbound, runs the length of Reach 10B. The northbound and southbound lanes of the expressway split on the northeast bank of the River at Almaden Road and merge again on the west bank of Reach 10B. Most of the banks in Reach 10B are reinforced with stepped gabions (Figure 4.15-7).

River Corridor. The views within the northern half of the River corridor lack vividness. There is no overstory in the channel to screen the views of the minimally vegetated stepped gabions. Near the bottom of the river channel, some scrub vegetation indicates seasonal









Upper Guadalupe River Flood Control Project

Figure 4.15-7.
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surface water, but the common view is of a dry river bed. Pedestrian use in this portion of the reach is generally low because of the lack of mature vegetation that would conceal views of the busy expressway.

The southern portion of Reach 10B is a wide channel, with a flat bench on the east bank located approximately 10 feet above the low-flow channel. Along the top of the east bench is a narrow path that is used by local youths and residents. A short (1- to 3-foot-tall) floodwall is also on the top of the east bank. This portion of the river corridor has virtually no mature vegetation. Dominant plants are coyote brush and annual forbs and grasses, with a few young riparian trees scattered about. Overall, this portion of the reach lacks visual variety.

Adjacent Circulation Ways. In the northern half of Reach 10B, views of the River by southbound motorists on Almaden Expressway are limited by the mature landscape trees on the top of the wide west bank. These plantings create a visual screen that contrasts with the adjacent riparian corridor. Northbound motorists have closer views of the grassy, gabion-lined channel framed by some mature trees growing on the east top-of-bank.

Adjacent Land Uses. High-density residential housing is located adjacent to Almaden Expressway on the west bank. Views toward the river corridor are framed by mature trees on the top of the west bank. The expressway's fast-moving traffic in the foreground adds a negative element to views of the riparian corridor. Some views also include the concrete flood wall on the east bank and the unvegetated riparian corridor.

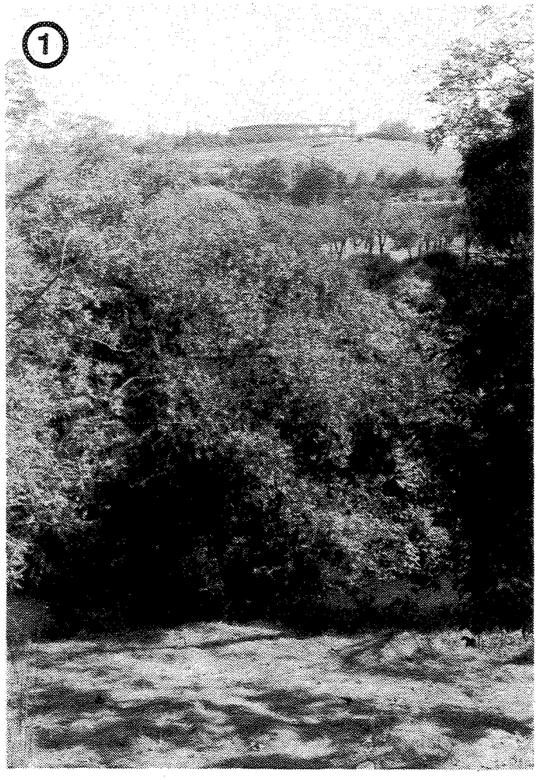
Multifamily residences along Skylark Drive are situated on the east bank. An alley with garages for the homes is adjacent to the River. Although the views of the gabion-lined channel lack visual variety, the wide corridor does confer a sense of open space. The few mature trees on the tops of the banks provide a vegetative foreground to frame views.

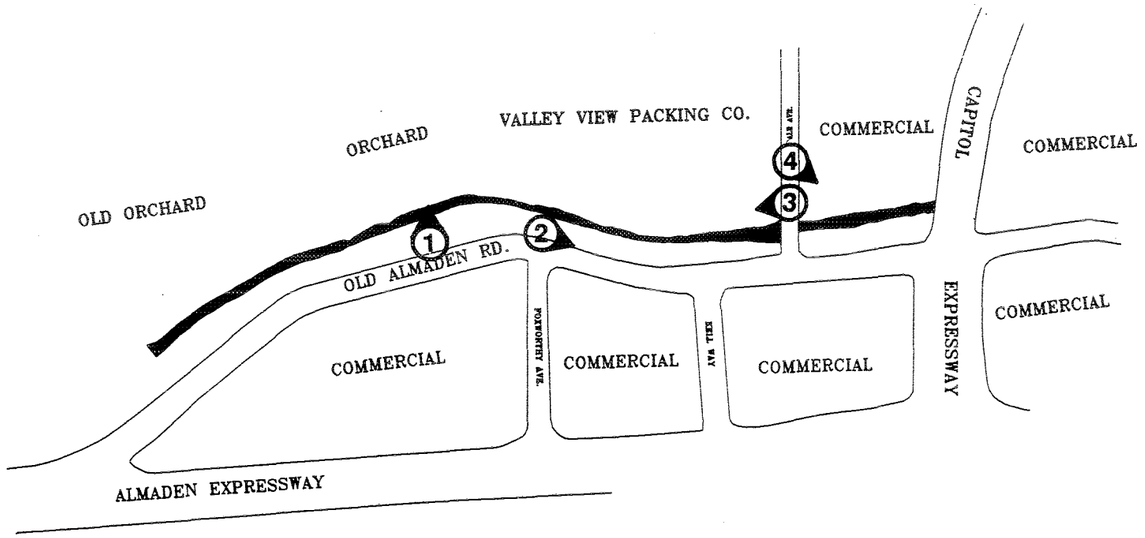
From the church on a nearby hilltop, Canoas Creek and the Reach 10B corridor can be seen. This hilltop vantage offers panoramic views of the San Jose area. From this location, surrounding land uses and urban forest blend along the River's course. Some parts of Reach 10B can be seen and the lack of vegetation is apparent.

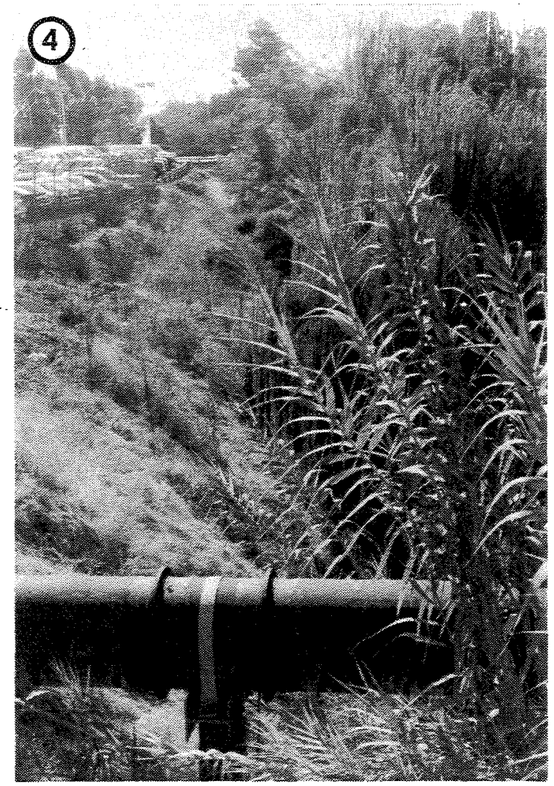
Reach 10C: Stream Gage Station No. 23B to Capitol Expressway

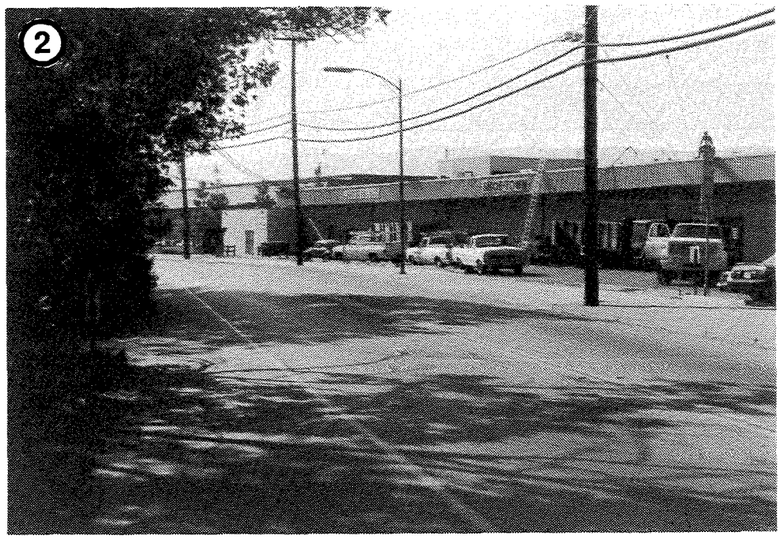
Reach 10C consists of a densely vegetated, narrow river channel north of Foxworthy Avenue and a less vegetated, wide channel south of Foxworthy Avenue. Mature riparian vegetation is clustered throughout the river corridor. The corridor has dense, scrubby understory vegetation on both banks, with large trees creating an open canopy at the top of the banks (Figure 4.15-8).

River Corridor. The northern portion of Reach 10C supports a densely vegetated riparian forest along a relatively undisturbed, narrow river channel. The banks are fairly steep, making the channel bottom generally inaccessible. Dense patches of poison oak and blackberries in the understory also discourage pedestrian access to the River.











Upper Guadalupe River Flood Control Project

Figure 4.15-8.
Visual Documentation for Reach 10C

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Between Kell Way and Foxworthy Avenue, the channel is wider and has a broad bench on the west bank, making pedestrian access easier. The bench is a buffer between the River and Old Almaden Road. The dense tree canopy on the bench partially encloses this area.

South of Kell Way, Reach 10C is sparsely vegetated. A few mature, non-native trees are scattered about and the remaining vegetation consists of low shrubs and grasses. At Capitol Expressway, the moderately steep riverbanks are lined with sacked concrete and fallen debris.

Adjacent Circulation Ways. Old Almaden Road is a narrow, two-lane roadway that follows the curve of the west bank. A pathway used by cyclists, pedestrians, and joggers parallels the river edge of Old Almaden Road. Its narrowness and proximity to the roadway discourage frequent use. The Valley View Processing Plant is adjacent to the east bank of the River, but views of the plant are partially blocked by deodar cedars planted along the edges of the buildings. Views of the riparian vegetation and the buildings of the Valley View Processing Plant are also possible from the very narrow Hillsdale Bridge. A dirt access road runs from Old Almaden Road down the bank to the stream gage. The dense vegetation in the river corridor north of Kell Way contrasts with the surrounding urban development, creating a somewhat vivid viewshed.

Capitol Expressway crosses the River at the southern boundary of Reach 10C. Motorists passing over the Capitol Expressway bridge have a brief glimpse of the riparian corridor. Pedestrians looking north from the Capitol Expressway Bridge have views of scattered mature riparian trees, giant reeds, some sacked concrete on the slopes, concrete rubble riprap, and refuse in the river channel. These elements combine to create a nonunified, non-vivid view.

Adjacent Land Uses. An orchard is adjacent to the northeastern bank of the River. The gridded regularity of the orchard trees contrasts only slightly with the random patterns created by the riparian vegetation, creating an intact view.

The Valley View Processing Plant, located on Hillsdale Avenue, is enclosed by chain-link fencing. Views of the riparian corridor from the plant consist of dense vegetation with scattered openings that frame views of the development on the west bank.

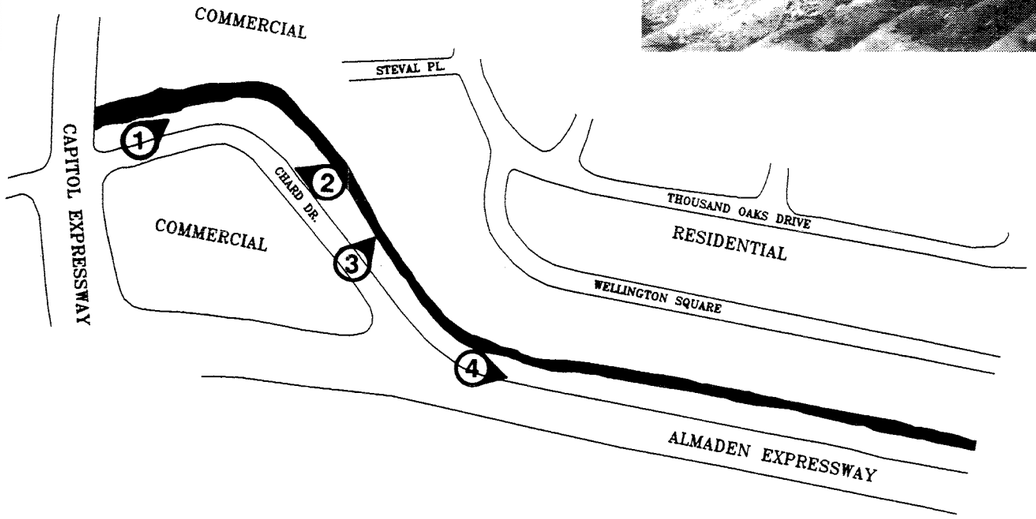
Small commercial businesses front the west side of Old Almaden Road between Capitol Expressway and Foxworthy Avenue. An apartment complex is located along Old Almaden Road north of Foxworthy Avenue. Employees, patrons, and residents of these establishments have intermittent views of the riparian corridor. Tall trees at the top of some of the west bank, including a mixture of sycamore and pine, create a vegetative screen that varies in form, texture, and color. Openings in the vegetation reveal the riparian corridor.

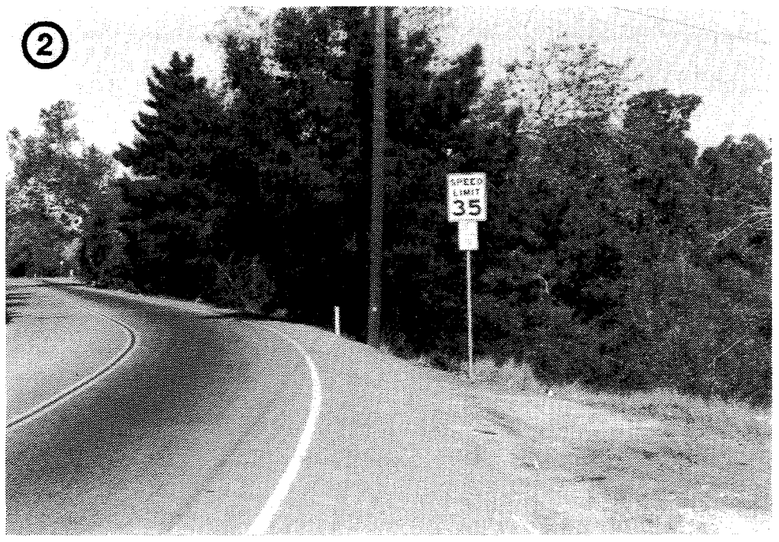
Reach 11A: Capitol Expressway to San Jose Water Company Property

Reach 11A is a wide, natural-appearing channel with a dense, riparian canopy. The steep west bank is virtually inaccessible, but the bench on top of the east bank is well-traveled by pedestrians. Almaden Expressway borders the west bank of the River (Figure 4.15-9).











Upper Guadalupe River Flood Control Project

Figure 4.15-9.
Visual Documentation for
Reach 11A

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River Corridor. Views near the downstream end of Reach 11A include the wide river corridor with scattered weeping willows within the channel and occasional large oaks and sycamores near the top.

The views within the majority of the river corridor are of a primarily natural-appearing riparian forest. Mature riparian trees create a mostly continuous, dense canopy on both the tops and sides of the banks, with a blackberry thicket understory. An east bank trail provides users moderately intact views of the trees and shrubs. Debris along the west bank of Almaden Expressway adds a negative element to these views.

Adjacent Circulation Ways. Capitol Expressway is the northern boundary of Reach 11A. Motorists crossing the Capitol Expressway Bridge have brief views of the River. Debris in the river channel adds a negative element to the views for pedestrians on the bridge.

Chard Drive closely borders the River on the west bank just upstream of Capitol Expressway. Foreground views of the mature sycamores and oaks on the top of the west bank are possible from this lateral drive. Dense vegetation on the east bank is visible through the sycamores and oaks in the foreground. The mature trees contrast with the surrounding urban development to create vivid views.

Almaden Expressway borders the west bank of the River. From this road, motorists have views of the riparian forest. Pedestrians and cyclists on the bicycle path along the shoulder of the northbound lane of the expressway also have views of the river corridor. These views include those of riparian and upland trees and glimpses of the homes on the east bank. This stretch of the River is heavily used by both pedestrians and cyclists.

Wellington Square (a residential street) parallels the east side of the River. Tall riparian trees can be seen over the rooftops of the single-family homes fronting this street. A wide bench on top of the east bank, between the houses and the River, serves as a trail for joggers, hikers, and cyclists and appears to be frequently used. The views consist of the River, riparian vegetation, and framed glimpses of Almaden Expressway.

Adjacent Land Uses. Single-family residences on Wellington Square abut the east bank of the River. From the backyards of these residences, views of the tall, dense riparian forest can be seen above the fences. The scattered trees in the corridor help to screen views of the traffic on Almaden Expressway on the west bank.

Development on the west bank of the River consists of small commercial enterprises located west of Chard Drive and multifamily housing west of Almaden Expressway. From the parking lots on Chard Drive, shoppers have vivid views of the riparian vegetation. Views for the residents across the expressway are primarily of street trees on the west side of the expressway, which screen most of the views to the river corridor.

Glimpses of the riparian trees are possible from commercial establishments on the northeast bank along Capitol Expressway. From this location, the riparian corridor is not readily distinguishable.

Reach 11B: San Jose Water Company Property to Ross Creek

This short subreach is similar to 11A, with dense, mature riparian vegetation, steep slopes, and a wide bench located along the top of both banks. Single-family residences border the east bank and Almaden Expressway borders the west (Figure 4.15-10).

River Corridor. Neighborhood residents use the top of the east bank as a pedestrian walkway. Wooden and chain-link fences abut the top of the bank, and many have gates opening to the river corridor. The tree canopy along the tops and sides of the river banks is dense, consisting of sycamores, cottonwoods, oaks, walnuts, and eucalyptus. Residents have planted non-native ornamentals along the top of the bank. Although these plants are not indigenous, they visually link the backyard landscapes with the riparian corridor.

Ross Creek marks the southern border of Reach 11B. It enters the main river channel from the west bank through a concrete apron and box culvert. These flood control structures are negative visual features in the natural setting of the riparian corridor.

Adjacent Circulation Ways. Almaden Expressway parallels the west bank of Reach 11B. Motorists have foreground views of the tall eucalyptus groves and mature riparian forest from this roadway. A bicycle lane on Almaden Expressway also provides to cyclists foreground views of the riparian forest and eucalyptus grove. The mature vegetation visually contrasts with the surrounding urban development, creating vividness in the viewshed.

Harvest Meadow Court is a small residential cul-de-sac perpendicular to Reach 11B's east bank. From this street, foreground views of the riparian corridor are possible. Pedestrian access to the River is also possible from here.

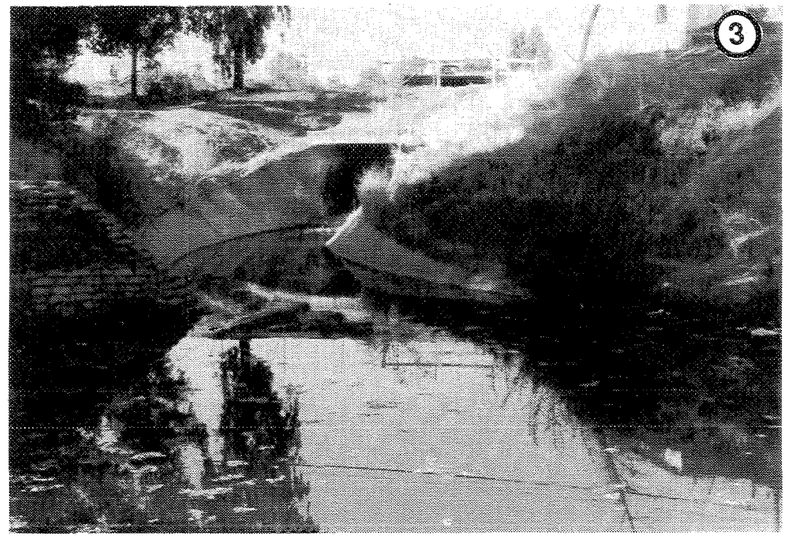
Thousand Oaks Drive is a residential street that parallels the east bank of the River. It has two neighborhood parks with many mature oaks scattered throughout. The tops of the trees in the river corridor can be seen above the neighboring rooftops, visually connecting the parks to the riparian zone.

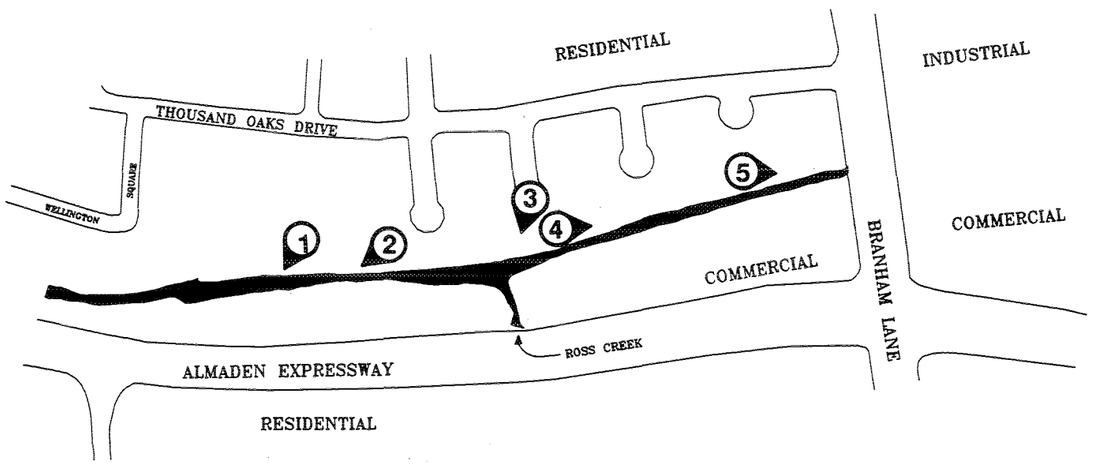
Adjacent Land Uses. A strip of land between the west bank and Almaden Expressway has a single, older residence with an adjacent small commercial business. Views of the riparian corridor from this location are vivid. Trash from the business has fallen down the bank and is visible to viewers from the east bank of the River. The trash is a negative visual element in the viewshed.

North of Harvest Meadow Court, on the east bank, is the SJWCo property. The extensive right-of-way is enclosed by a chain-link fence that blocks access to the top of the riverbank. A mature eucalyptus grove in the well field is a visual landmark for local residents and contributes to the overall visual vividness of the river corridor.













Upper Guadalupe River Flood Control Project

Figure 4.15-10.
Visual Documentation for
Reach 11B and 11C

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Reach 11C: Ross Creek to Branham Lane

This reach has steep banks, a narrow channel, mature riparian vegetation, and eucalyptus trees. The west bank is partially developed along Almaden Expressway, with commercial businesses located near Branham Lane. A residential neighborhood is adjacent to the east bank (Figure 4.15-10).

River Corridor. The steep banks are covered with dense riparian vegetation. Pedestrians able to negotiate the steep banks have views of the shaded river bed under the riparian forest canopy.

Along the top of the bank, the canopy consists of eucalyptus and dense, mature riparian trees. There is a maintenance road along the top of the east bank in this reach. Pedestrian trails, also along the top of the east bank, are heavily used by local youths and joggers. The west bank is very steep, limiting access.

Adjacent Circulation Ways. Almaden Expressway parallels the west bank of the River. Motorists have only brief glimpses of the riparian corridor. Views of the riparian vegetation are also possible from a bicycle path along the edge of the expressway.

Branham Lane is a busy thoroughfare that crosses the River at the southern border of Reach 11C. From Branham Lane Bridge, motorists and pedestrians have views north to Reach 11C, which is lined with mature riparian trees. Refuse disposed of from this bridge is a negative visual element in this viewshed.

Thousand Oaks Drive is a residential road with views of riparian trees above the rooftops. The vegetation helps to visually enclose the neighborhood from the surrounding urban development.

Adjacent Land Uses. The land on the west bank of the reach is developed by only a few commercial businesses at Branham Lane and Almaden Expressway. From the parking lots, users can see glimpses of the riparian vegetation that contrasts with the surrounding urban development, creating a minimally vivid view.

Single-family residential housing is located on the east side of the River. Three cul-de-sacs end at the riverbank, where the riparian corridor appears park-like and blends with the surrounding neighborhood. Views for these residences are similar to those described for the residences in Reach 11B.

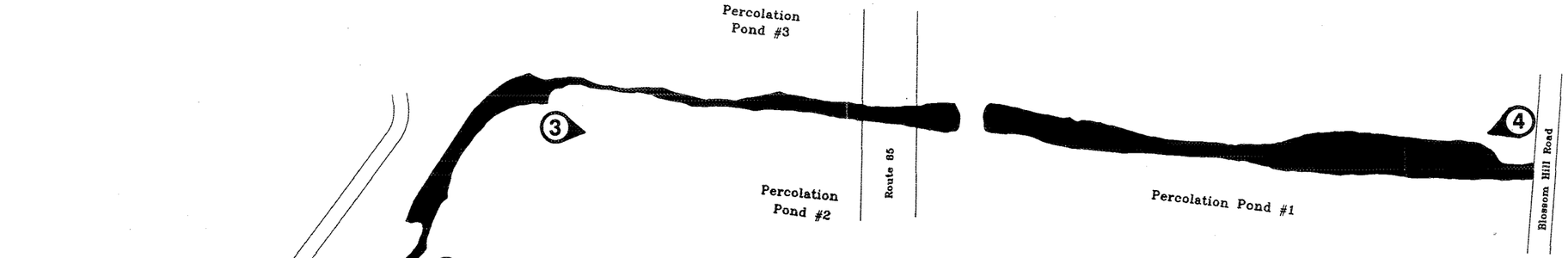
Reach 12: Branham Lane to Blossom Hill Road

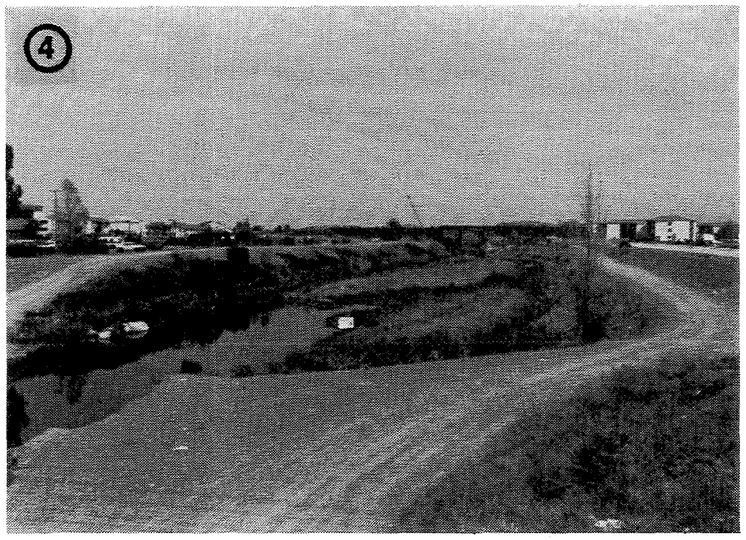
This reach is open and wide, with only scattered mature riparian trees. A family farm, two shopping centers, and medium-high-density housing are on the west bank of Reach 12. Another residential neighborhood is adjacent to the northeast bank of the River (Figure 4.15-11).











Upper Guadalupe River Flood Control Project

Figure 4.15-11.
Visual Documentation for
Reach 12

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River Corridor. The wide channel bottom is sparsely vegetated with shrubs, forbs, and annual grasses. A few mature riparian trees, primarily large sycamores, oaks, and buckeyes, grow along the top of the banks at and just downstream of the bend in the river. Non-native species of almonds, eucalyptus, and walnuts also grow along the tops of banks. At the time of the field reconnaissance to the area, a temporary gravel dam was in place across the River

at the downstream section of Reach 12, creating an in-stream percolation pond to allow recharge of water into the aquifer.

Upstream of the river bend, Reach 12 lacks visual variety. Many of the banks have been channelized and stripped of vegetation to increase percolation, and sacked concrete lines the banks in some areas. There are a few trees, scattered shrubs, and grasses on the slopes. Between the new SR 85 overpass and Blossom Hill Road, the slopes are almost vertical and devoid of vegetation. From the top of the banks, there is an open view in all directions.

District maintenance roads, located along both banks of Reach 12, are heavily used as trails by local residents.

Adjacent Circulation Ways. Almaden Expressway is located west of the family farm some distance from the River. Motorists along this busy road have distant views of the few tall sycamores at the tops of the banks in the northern part of the reach. Views of the riparian vegetation are also possible from the bicycle lanes along Almaden Expressway.

Three major roadways cross the reach: Branham Lane in the north, SR 85 in midreach, and Blossom Hill Road in the south. Views looking south to Reach 12 from Branham Lane Bridge consist of scattered mature eucalyptus and sycamore; a wide, grass-covered riverbed; bare, gabion-lined slopes; and commercial buildings on both sides of the River.

Views of the river corridor are possible from the SR 85 overpass. The views consist of homes with residential landscaping, scattered riparian vegetation, percolation ponds, and agricultural lands. Most of the landscape is vegetated, with minimal built environment, creating a vivid viewshed in the heavily urbanized valley.

Chynoweth Avenue, a four-lane road that dead-ends on the east side of the River just north of SR 85, has views across the river channel to the farmland. A bridge is proposed that will bring Chynoweth Avenue across the River. Sanchez Drive, a moderately traveled residential street, is proposed to be extended under SR 85, connecting with the Chynoweth Avenue extension. These extensions will bring a large number of viewers into closer proximity with the river corridor and will create views that encompass the percolation ponds in the southern part of the reach.

At the south end of the reach, Blossom River Drive parallels the east bank for a short distance. Views of the river corridor from this lightly traveled road extend past the percolation ponds. This segment of the reach is sparsely vegetated, with one sycamore at the end of the road.

Adjacent Land Uses. Older, single-family residences are adjacent to the east bank of the River along Tonino Drive. Fences and backyard landscaping screen the river channel from

these residences. Many backyard gardens of these residences extend onto the top of the bank. Views of the wide river channel and farmland give a suburban feel to the landscape.

A large portion of land surrounding Reach 12 is District right-of-way for the Guadalupe groundwater recharge facility. This facility includes three large percolation ponds on both sides of the River. Views of the percolation ponds and the minimal vegetation in the river corridor are possible from the three-story condominiums and apartments along Sanchez Drive, as well as from retirement apartments on Blossom River Drive. The reflective quality of the water creates a vivid viewshed.

A variety of commercial businesses front Almaden Expressway, Blossom Hill Road, and Branham Lane. Views are vivid, consisting of a scattering of mature trees at the tops of the banks, the river channel, and open farmland, contrasting with urban development.

The Oakridge Mall, a large shopping center on Blossom Hill Road, attracts thousands of shoppers daily. From the mall's parking lot, views of the river corridor and the percolation ponds beyond it are possible. The adjacent Oakridge LRT station on Winfield Boulevard also has views of the river corridor to its west. These views are vivid due to the uniqueness of wide open space in a highly urbanized area.

Agriculture is a major adjacent land use. A family farm is located next to Almaden Expressway, between the commercial businesses and shopping centers along Branham Lane and Blossom Hill Road. The views of the northern riverbanks from the fields include a few sycamores and oaks, the riparian corridor, and the east bank neighborhoods. The southern viewshed, from this vantage, is comprised of bare rocky banks and multifamily residences.

Canoas Creek: Almaden Expressway to Nightingale Drive

Canoas Creek is a flood control channel, with trapezoidal banks. District maintenance roads are located on the tops of both the north and south banks. Single-family residential backyards are adjacent to both maintenance roads. Public use is prohibited and there are locked chain-link gates at Nightingale Drive and Almaden Expressway.

The overall visual character of this reach is that of a drainage ditch rather than a riparian corridor. Flood control measures have removed the riparian vegetation, leaving bare earth and concrete banks. Motorists along Nightingale Drive have views that include Canoas Creek. Pedestrian views into the creek corridor are also possible from Nightingale Drive, and residences with backyards abutting the creek have views into the river corridor. All of these views are of a straight, barren ditch and lack vividness.

Ross Creek: Almaden Expressway to 700 Feet Upstream of Jarvis Avenue

Ross Creek is similar to Canoas Creek in structure and visual character. Single-family residential backyards border the maintenance roads. Public use is prohibited by locked chain-link gates at Almaden Expressway, Cherry Avenue, and Jarvis Avenue. The views are also similar to those of Canoas Creek.

Environmental Consequences/Impacts and Mitigation Measures

Significance Criteria

CEQA Guidelines applicable to visual impacts state that a project will normally have a significant effect on the environment if it will conflict with adopted environmental plans and goals of the community where it is located or have a substantial, demonstrable negative aesthetic effect.

Visual impacts in a visually sensitive area (see "Visually Sensitive Areas" below) were considered significant if the project would:

- substantially reduce the visual quality of views from residences, businesses, or well-traveled roads located near the project by introducing into the landscape visually incongruous elements in terms of scale, form, line, color, or texture that negatively affect visual unity, vividness, or intactness;
- remove or substantially alter existing landforms, structures, or vegetation to reveal lower quality views, obstruct high-quality views, or substantially reduce viewer perception of visual quality or aesthetic character (i.e., perceptions that an area possesses certain salient qualities, such as shade, coolness, filtered light, rustling leaves, and singing birds, that in combination give it aesthetic value); or
- remove vivid or other important and high-quality views of vegetation or other elements of the landscape.

Impacts were considered less than significant if they did not meet any of the criteria listed above or if they occurred in an area that was not identified as visually sensitive (see "Visually Sensitive Areas" below).

Beneficial impacts include improving the visual quality of views from residences, businesses, or well-traveled roads located near the project by introducing into the landscape visually congruous elements in terms of scale, form, line, color, or texture that positively affect visual unity, vividness, or intactness and removing or substantially altering existing landforms, structures of low or degraded visual quality, or vegetation to create or reveal high-quality views or obstruct lower quality views.

Introduction

Project-related visual impacts may result from construction activities, constructed elements of the project, or operation and maintenance activities following project construction.

Visual impacts associated with construction activities include vegetation removal; earthwork activities; removal of infrastructure and structures; construction of structures such as retaining walls, drainage structures, gabions, fences, access ramps, and bridges; and the presence of staging areas, storage areas, and heavy equipment.

Visual impacts of constructed elements of the project may be caused by the existence of new or altered structures, including retaining walls, gabion structures, bypass channels, access

ramps, drop structures, concrete box culverts, maintenance roads, rock revetments, and other appurtenant facilities, or the removal of existing structures.

Visual impacts of operation and maintenance activities following project construction may be caused by removal of vegetation as part of vegetation control and maintenance; removal of sediments, debris, and obstructions from channels and adjacent areas; and repair, cleaning, and replacement of facilities and structures. Operation and maintenance activities that may result in visual impacts would include only activities that differ from current District operation and maintenance procedures.

Following is a description of assumptions regarding project-related impacts.

Construction Impacts

The following assumptions were made regarding construction-related visual impacts.

- With the exception of vegetation removal, construction-related impacts would be short term and would end with the completion and cleanup of construction activities. Cleanup would include the full removal of all construction equipment, storage areas, staging areas, and temporary structures and the full repair of all disturbed areas.
- Impacts of vegetation removal would persist for many years until the visual functional value of the previously existing vegetation was fully replaced.
- Substantial amounts of concrete rubble and household and commercial debris would be removed from the project area before and during construction. The project would result in increased public access to areas of the River, and unauthorized dumping in the project area could continue.

Constructed Elements of the Project

Revegetation recommended to mitigate for impacts on visual resources assumes the following:

- Revegetation areas proposed by the District would contain vegetation of sufficient size and density to effectively achieve a minimum of 50 percent visual screening in 5 years.
- Where the proposed revegetation occurs in visually sensitive areas and is located such that it effectively screens project impacts, impacts are considered to be mitigated to a less-than-significant level.

Operations and Maintenance Impacts

- Increased flood capacity would enable the District to allow vegetation to grow to taller heights and larger diameters on slopes in reaches of the natural channel areas where bypass channels, floodway benches, or channel widening are proposed. Native vegetation would remain except in a 25-foot-wide strip centered on the existing low-flow channel in Reaches 6-12 and a 50-foot-wide strip in Reach A. The District also

proposes to replace mechanical clearing procedures with hand-clearing methods, allowing selective removal of non-native plants when clearing is needed.

Visually Sensitive Areas

Visually sensitive areas are areas of particular concern or importance to viewers or important viewer groups. These areas may or may not be of high visual quality. They are sensitive areas because of one or more of the following characteristics:

- prominence in the local area;
- special meaning or value to local or regional residents;
- relative scarcity in the local area or region;
- visibility to large numbers of viewers or viewers with high concern for visual quality and aesthetic character (e.g., local residents or recreationists); or
- relatively high duration of frequency of viewing of the area.

The U.S. Army Corps of Engineers (1984) defines visual sensitivity as "the degree of observer interest in visual quality and concern for existing conditions and/or proposed changes to the landscape." However, for this project, visual sensitivity of the corridor is based on criteria defined by the Federal Highway Administration (1988):

- User groups. User groups engaged in various activities have differing levels of sensitivity to their surroundings. Residential and recreational user groups generally have much higher awareness and sensitivity levels than do users of commercial establishments and commuters.
- View duration. The longer the length of time that a viewer sees a setting, the more sensitive the area tends to be.
- Local values. Local values include the prominence of the views in the local area, their special meaning or value to residents, and their relative scarcity in the local area. Local values were established for the Guadalupe River during public scoping meetings conducted by the District.

Photosimulations

Selected visually-sensitive locations in the project area were photographed and computer manipulated to depict probable future views. Aerial views were taken of three locations (Reaches 6, 7, and 10) and simulations were created that depict preproject views and postproject views with mature mitigation vegetation. Ground views were also taken of five locations (Reaches 7, 8 [two views], 10, and 11). Two simulations were created for each aerial view: preproject and postproject with mature mitigation vegetation. Three simulations were created for each ground view except Reach 11A. The first depicts the preproject view and the second the view immediately following construction of the project before mitigation vegetation has been planted. The third view illustrates a postproject view with mature mitigation vegetation established. Preproject views and postproject simulations are shown in Figures 4.15-12 through 4.15-30.

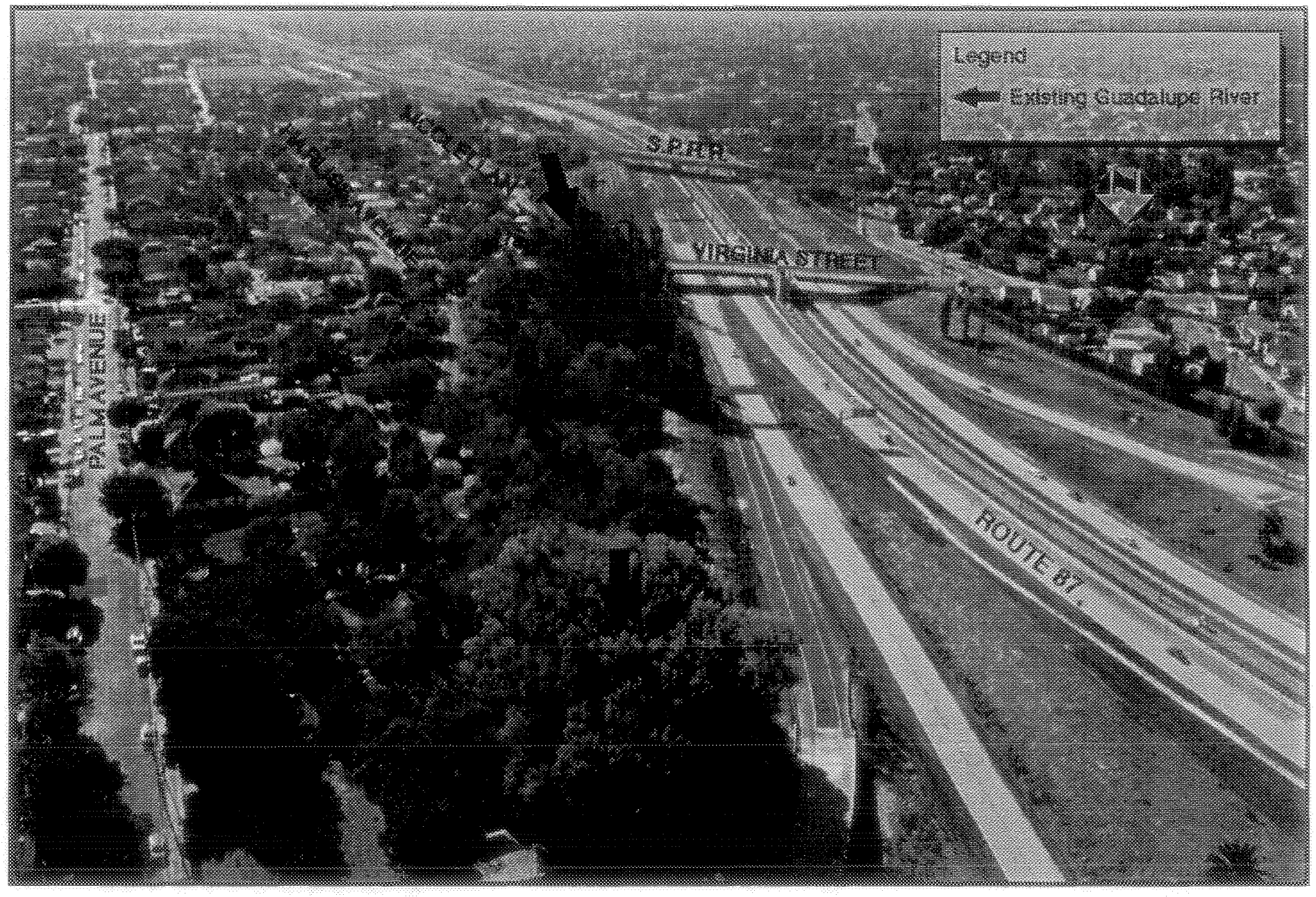


Figure 4.15-12. Reach 6 - Preproject Aerial View



Figure 4.15-13. Reach 6 - Postproject Aerial Simulation with Mature Mitigation Vegetation



Figure 4.15-14. Reach 7 - Preproject Aerial View



Figure 4.15-15. Reach 7 - Postproject Aerial Simulation with Mature Mitigation Vegetation

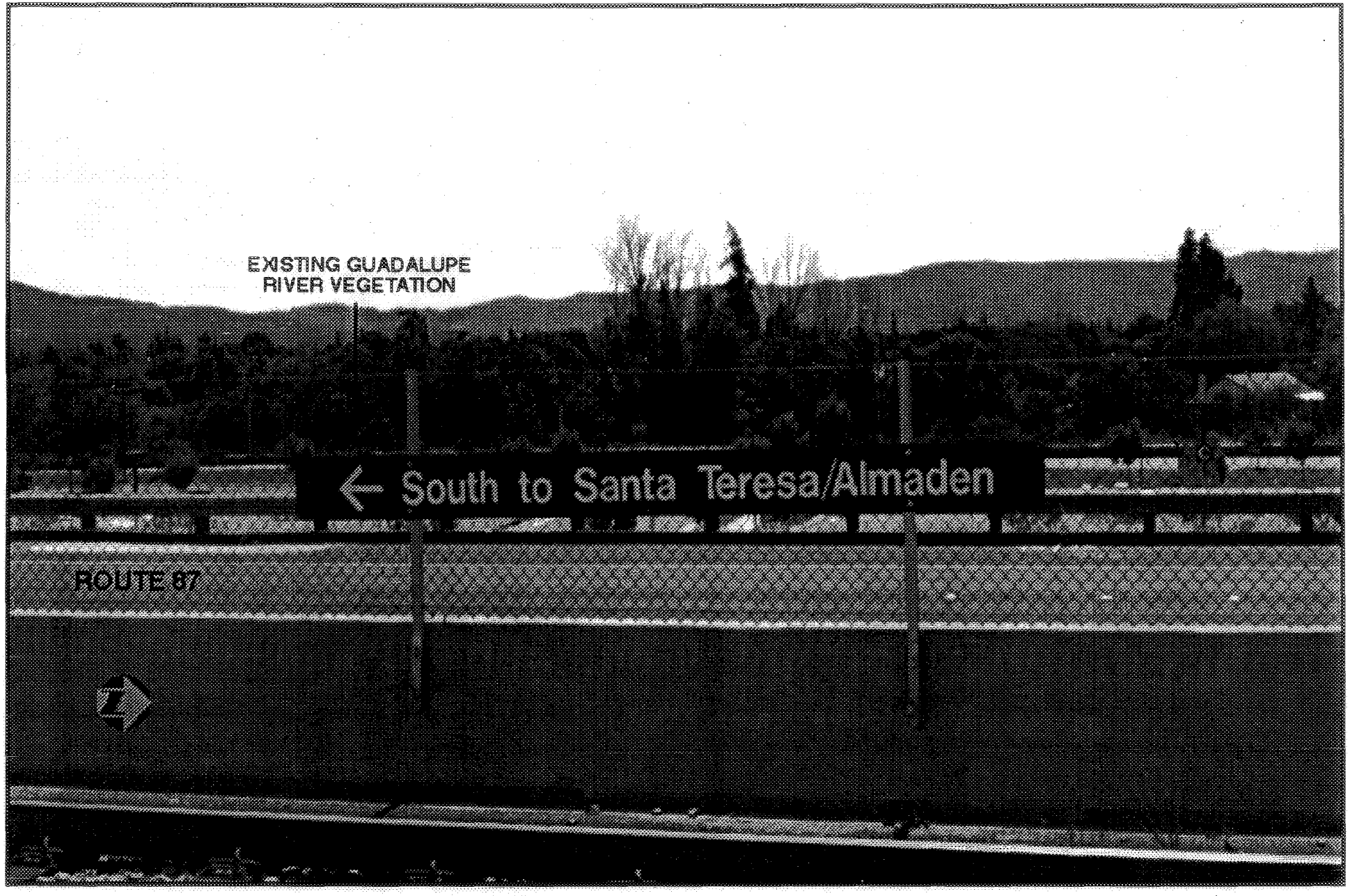


Figure 4.15-16. Reach 7 - Preproject View

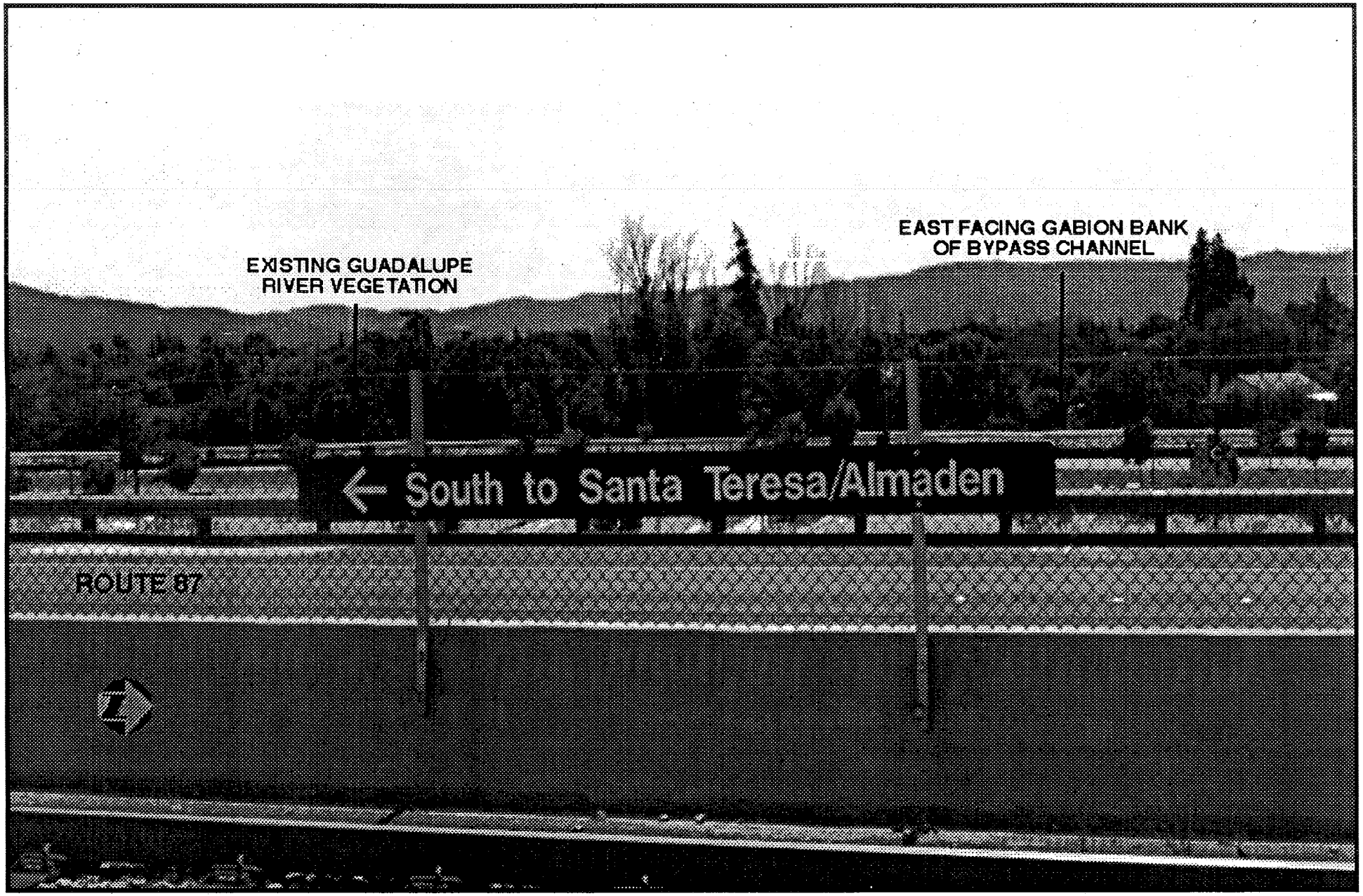


Figure 4.15-17. Reach 7 - Postproject Simulation without Mitigation Vegetation

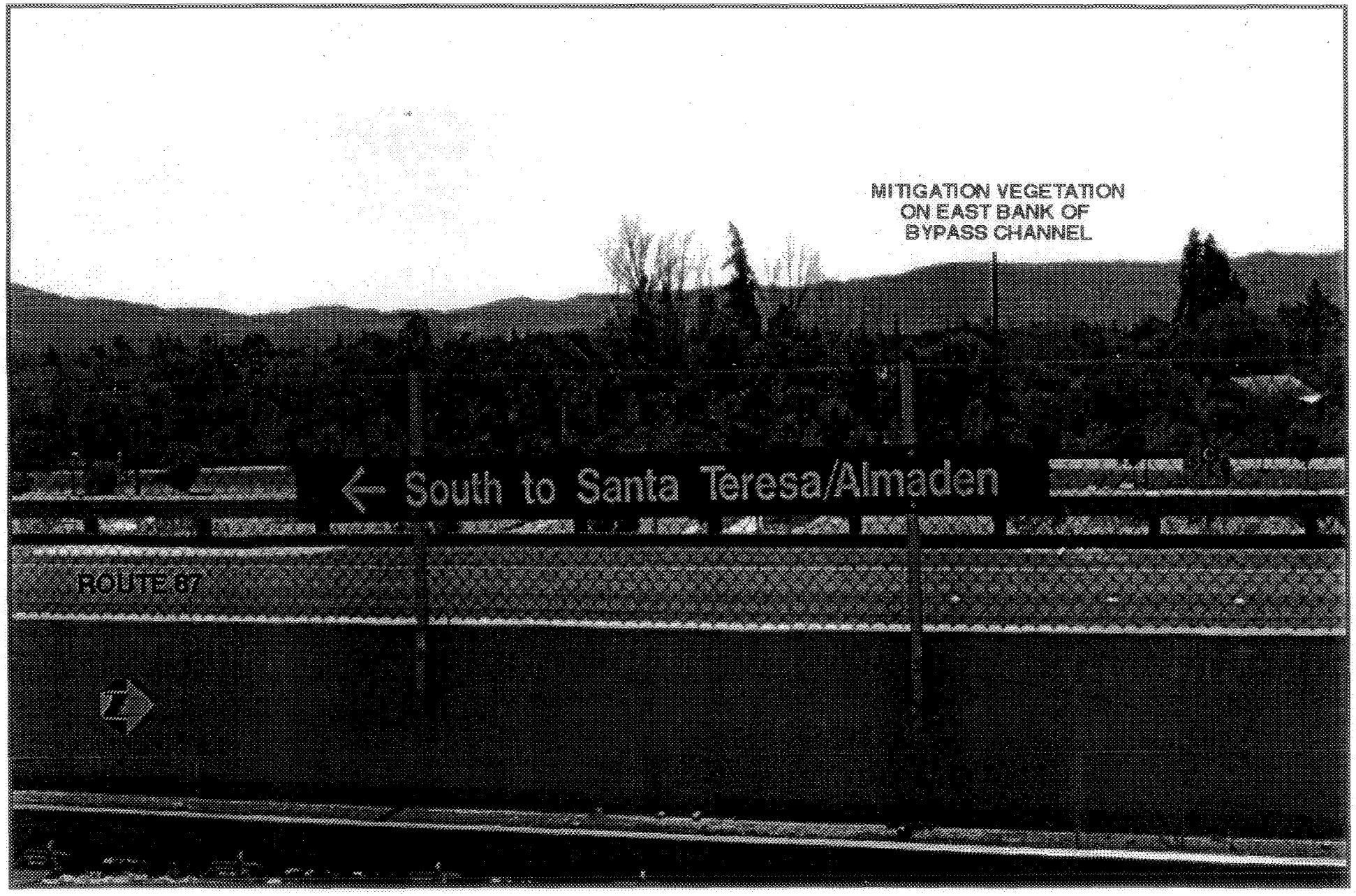


Figure 4.15-18. Reach 7 - Postproject Simulation with Mature Mitigation Vegetation

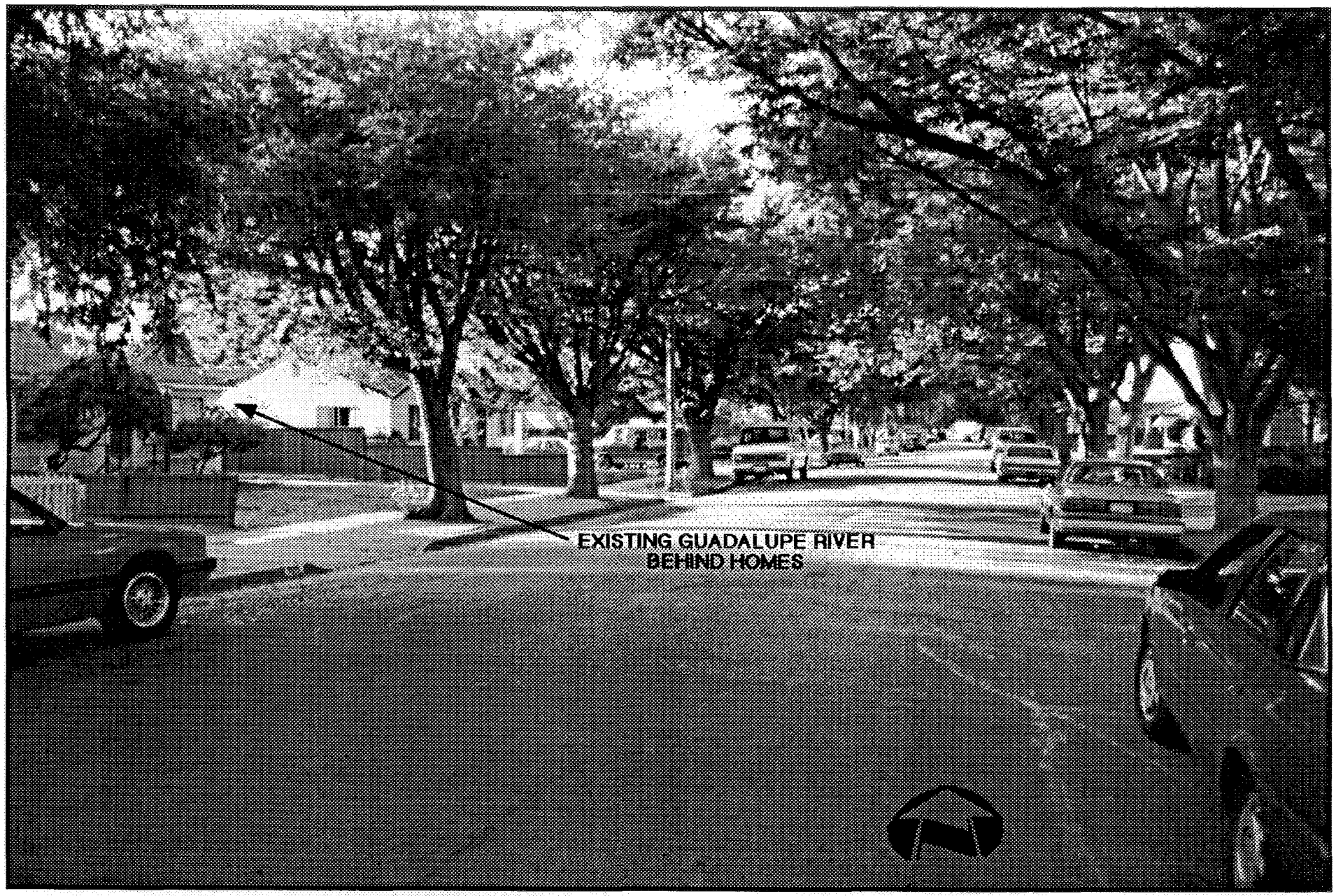


Figure 4.15-19 Reach 8 - Mackey Avenue Preproject View

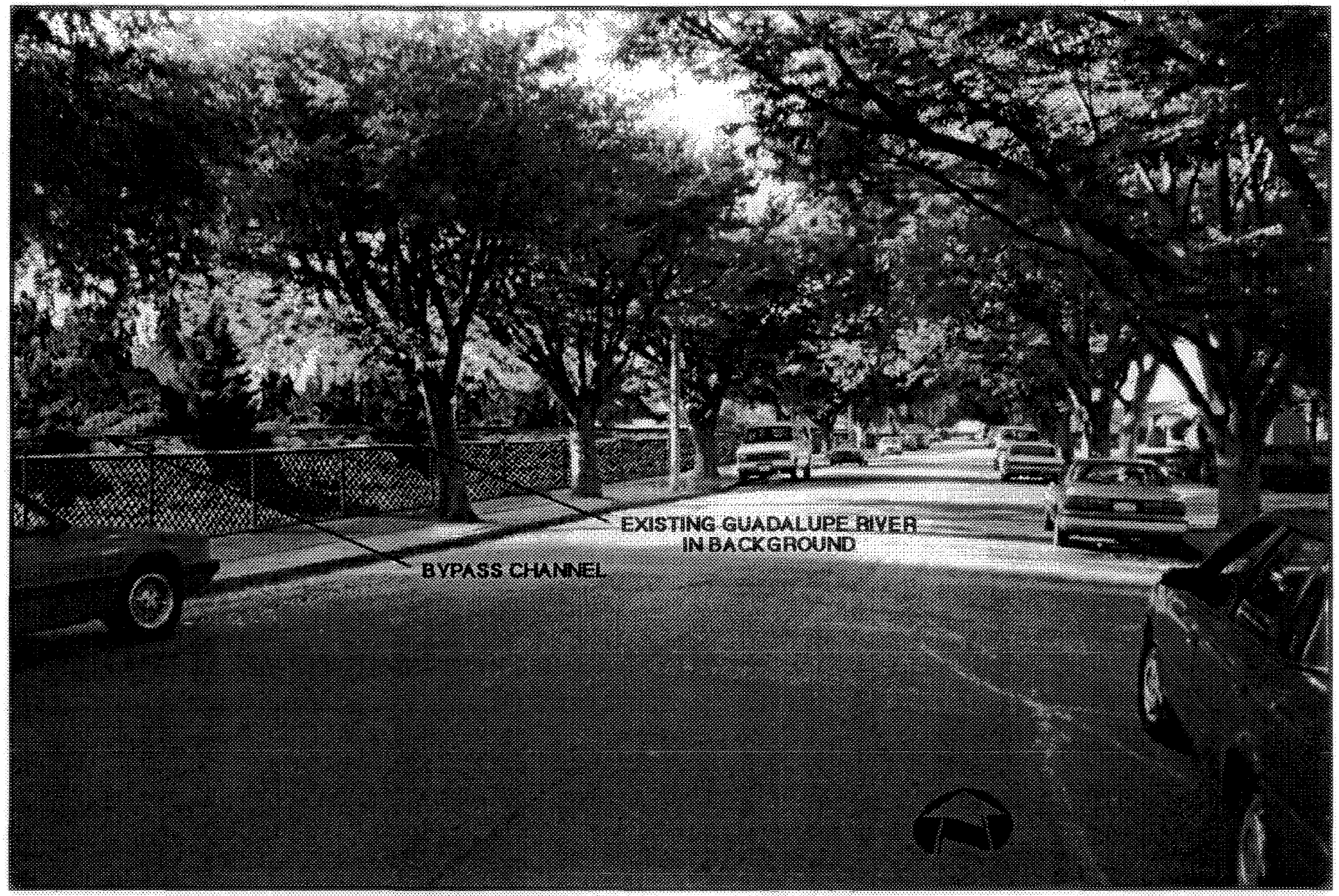


Figure 4.15-20 Reach 8 - Mackey Avenue Postproject Simulation without Mitigation Vegetation

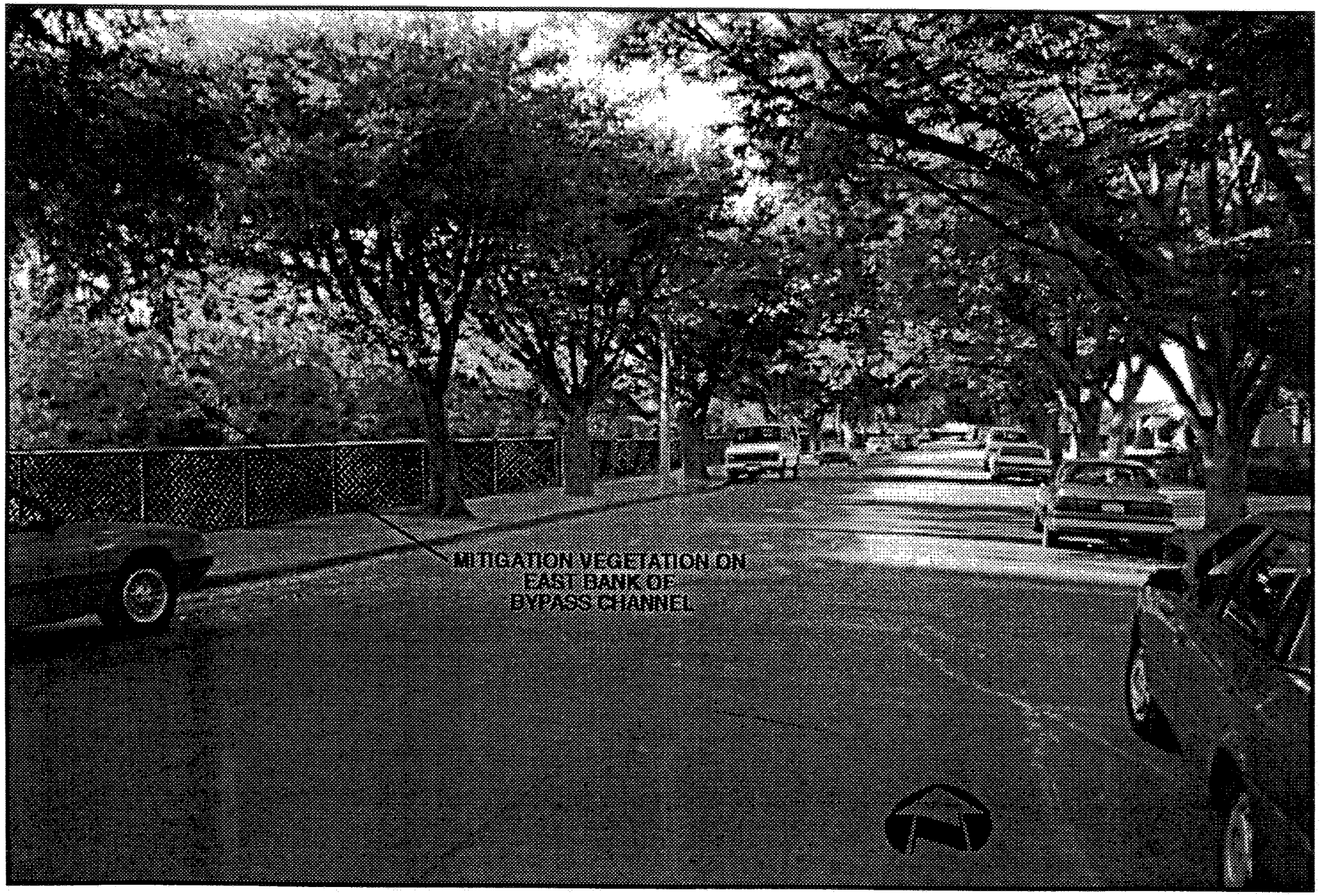


Figure 4.15-21 Reach 8 - Mackey Avenue Postproject Simulation with Mitigation Vegetation

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Figure 4.15-22.
Reach 8 - Willow Glen Way
Bridge Preproject View

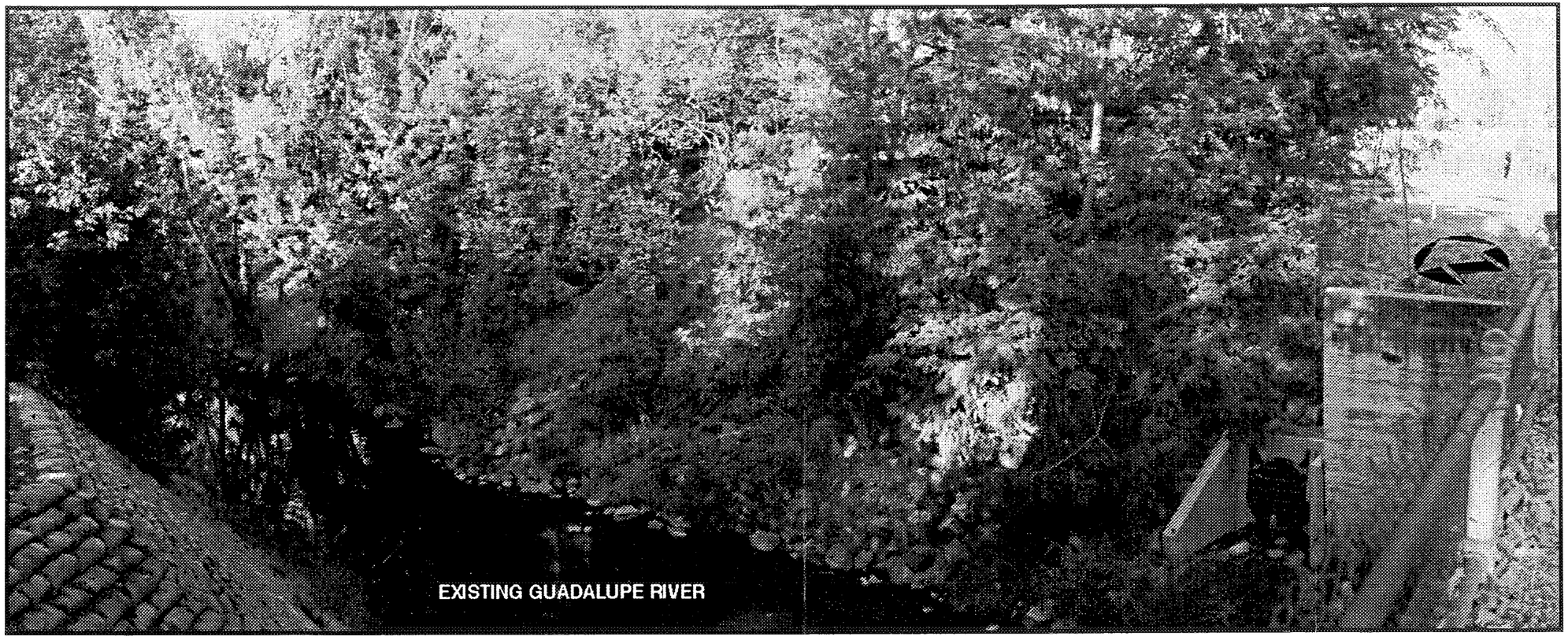


Figure 4.15-23.
Reach 8 - Willow Glen Way Bridge Postproject Simulation without Mitigation Vegetation

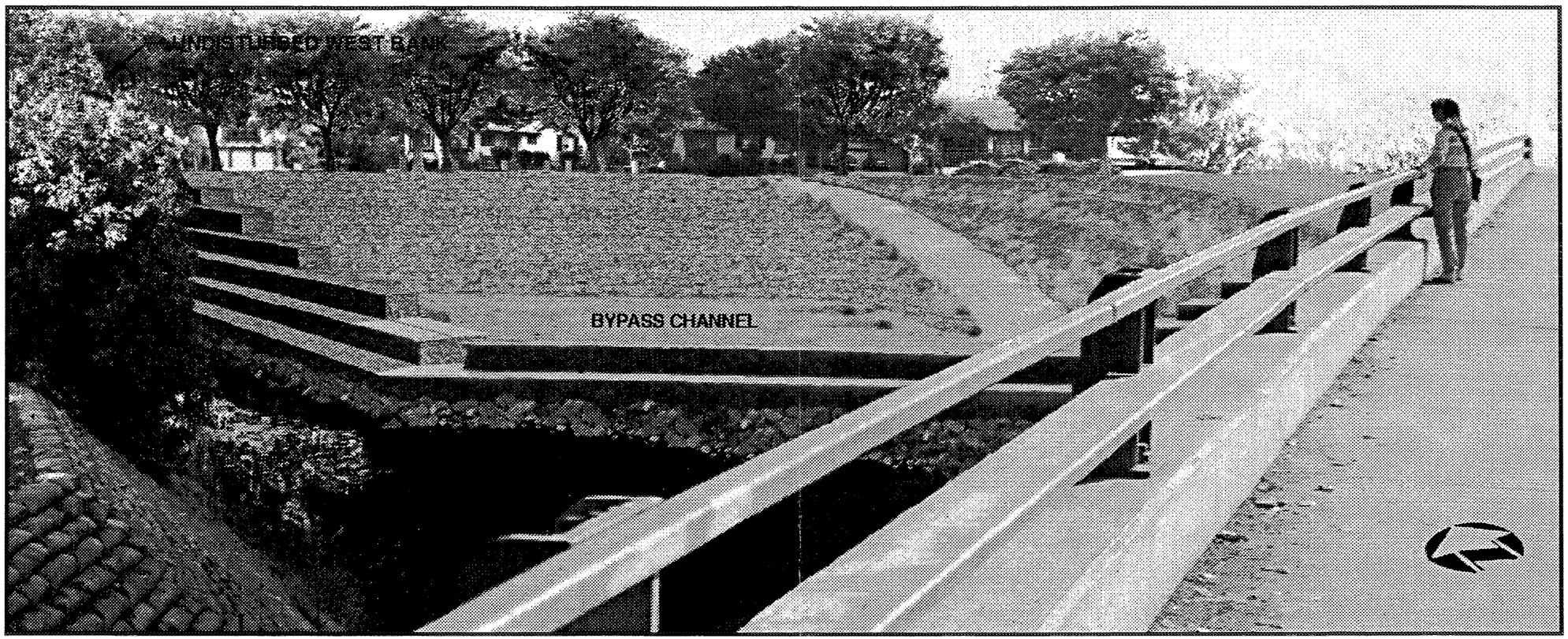
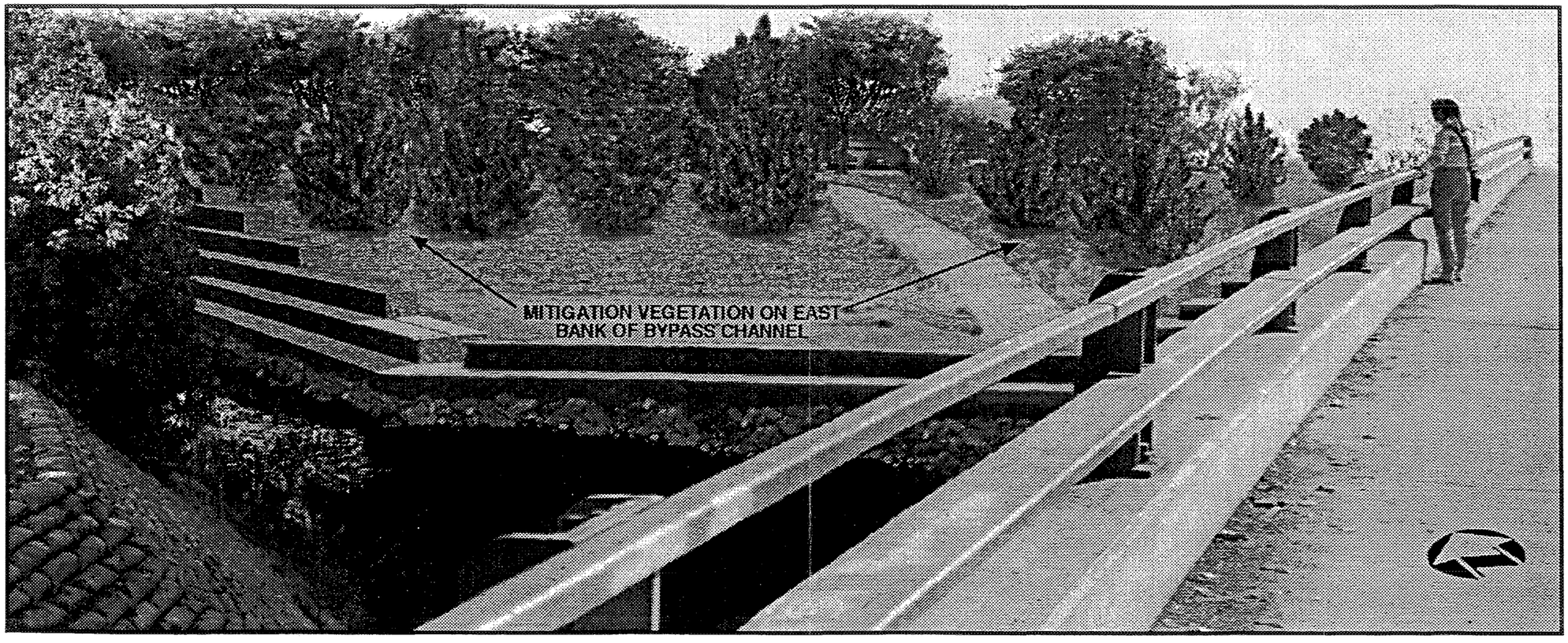


Figure 4.15-24.
Reach 8 - Willow Glen Way Bridge Postproject Simulation with Mature Mitigation Vegetation



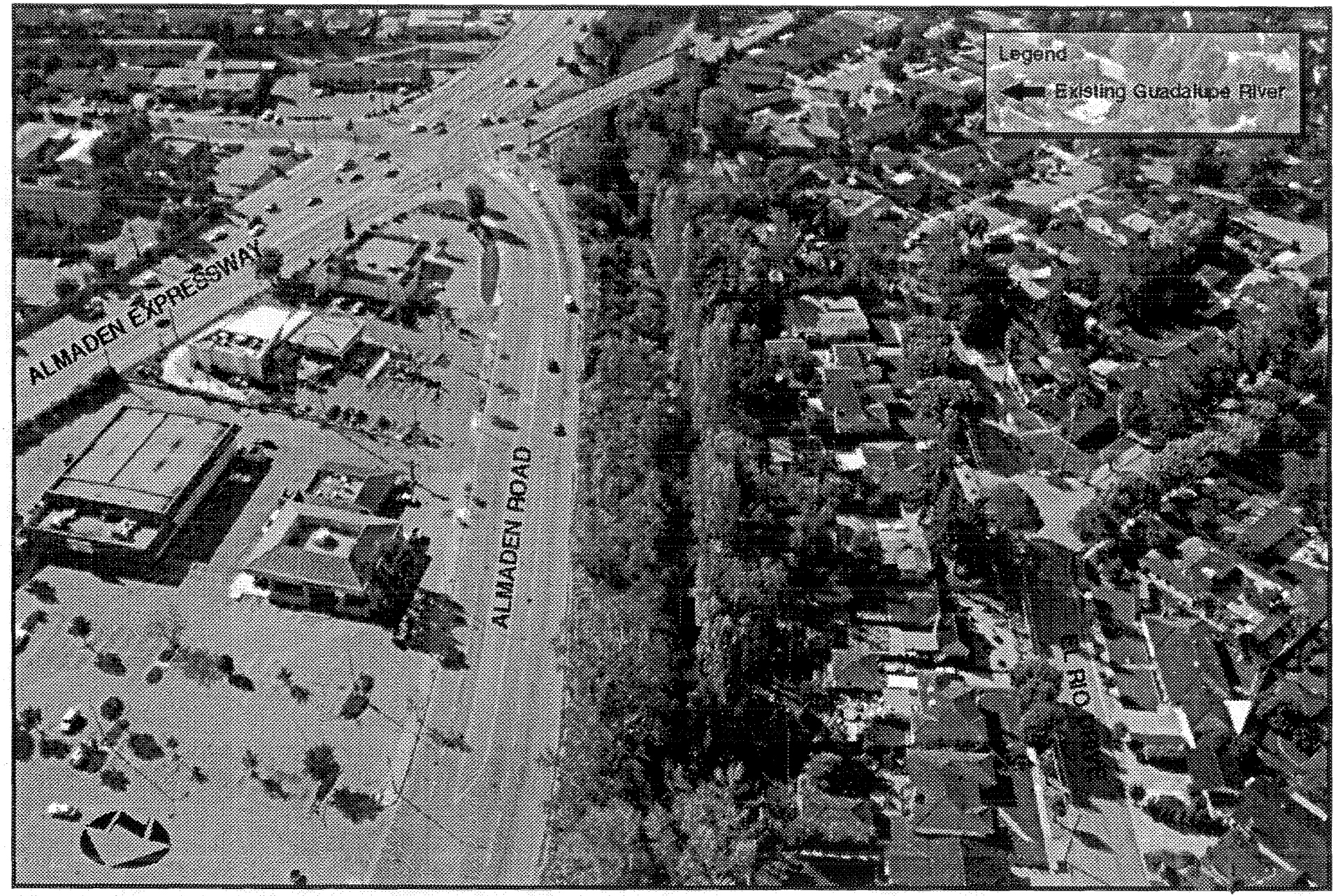


Figure 4.15-25. Reach 10A - Preproject Aerial View



Figure 4.15-26. Reach 10A - Postproject Aerial Simulation with Mature Mitigation Vegetation

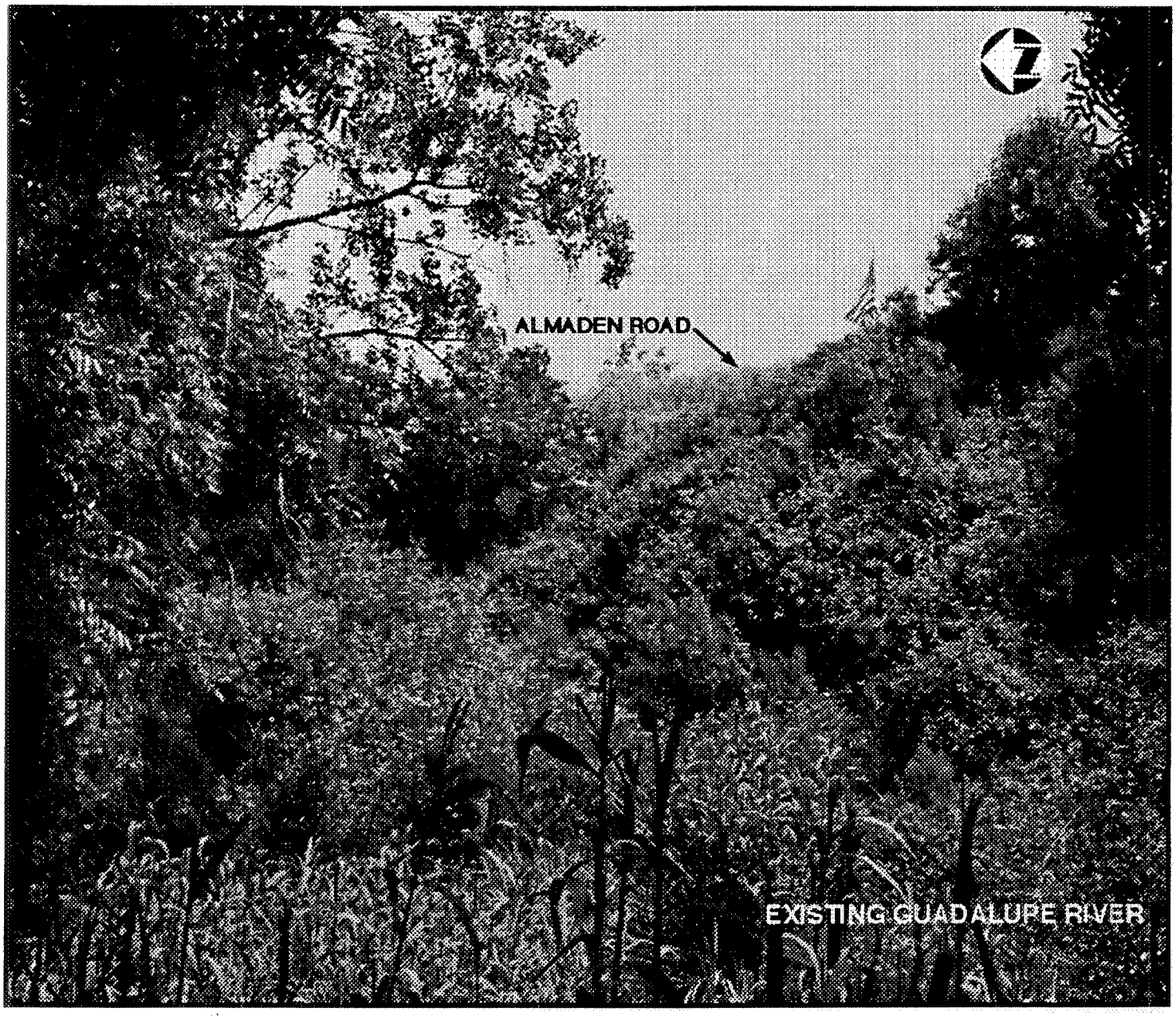


Figure 4.15-27. Reach 10A - Preproject View (from Bottom of West Bank Looking East Toward McDonald's)

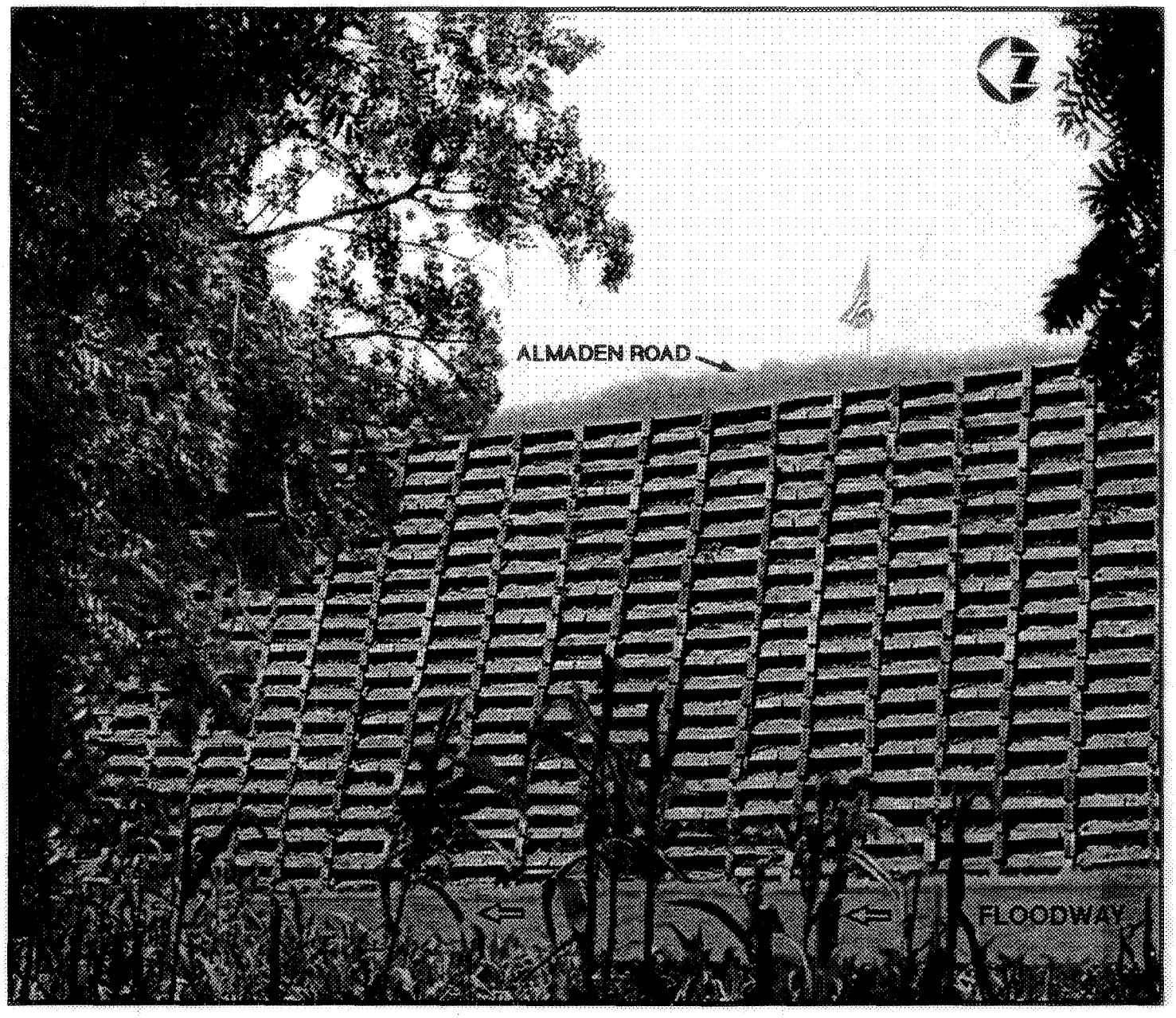


Figure 4.15-28. Reach 10A - Postproject Simulation without Mitigation Vegetation

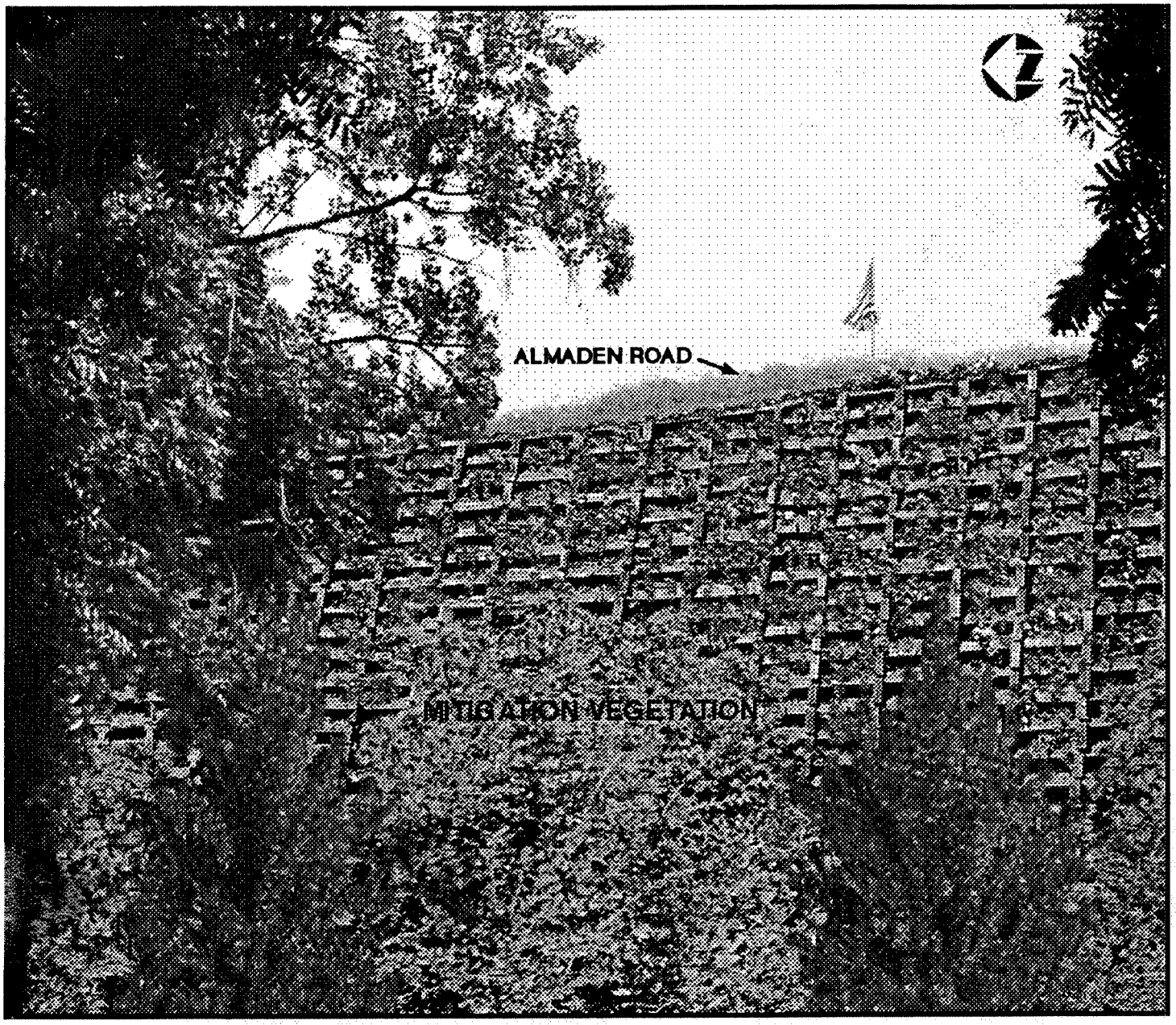


Figure 4.15-29. Reach 10A - Postproject Simulation with Mature Mitigation Vegetation

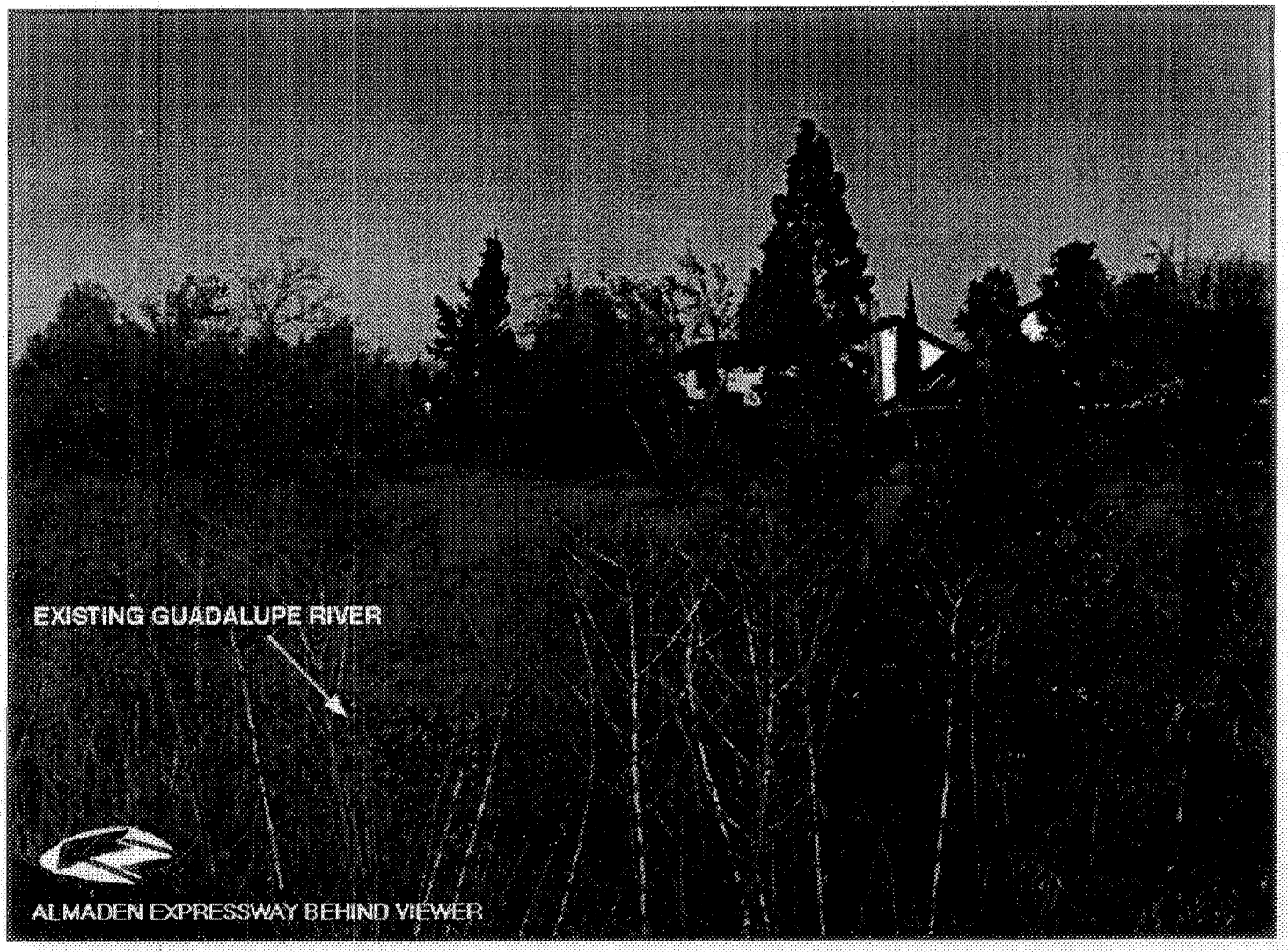


Figure 4.15-30. Reach 11A - Preproject and Postproject View (from Almaden Expressway Looking East)

Reach-Specific Evaluations of Visual Sensitivity

To assess visual/aesthetic impacts, the visual sensitivity of areas to be affected by the project needed to be determined. The Guadalupe River is long and complex, with many different factors influencing the visual sensitivity of each reach. The Federal Highway Administration (1988) criteria described above (user group, view duration, and local values) were used to evaluate the visual sensitivity along the Guadalupe River in the project area. Reaches that were too complex to evaluate as a whole were identified as homogeneous units by station points based on adjacent land uses.

The "user group" category was divided into four subcategories: residential, recreational, commercial, and commuter. All residential and recreational users were assigned a rating of high sensitivity because of their strong preconceptions about the visual appropriateness of the project in their area. Commercial users were assigned a rating of low sensitivity because of their tendency to be less concerned about the natural setting. Commuters were assigned a rating of low because of their lowered perception of the natural setting and heightened concern for road conditions.

The "view duration" category was divided into two subcategories: long term and short term. The longer the time span that individuals have to view the River and the project, the more sensitive they are likely to be. Thus, a long-term view duration was assigned a rating of high and a short-term view duration was assigned a rating of low.

The "local values" category was divided into two subcategories: high and low. If a viewer group expressed objections or concerns about the project during public scoping conducted by the District, the local values category was assigned a rating of high. If no concerns were expressed, the local values category was assigned a rating of low.

Numerical values were assigned to each rating: high = 3, medium = 2, and low = 1. Numerical values were added for each reach or section of a reach to equal the sensitivity rating. Station points with sensitivity ratings of 9 or more were classified as visually sensitive areas because this numerical value would indicate at least two high sensitivity ratings within the area.

Table 4.15-1 summarizes numerical assignments of visual sensitivity. Figure 4.15-31 illustrates the location of visually sensitive areas along the river corridor. The rationale for assigning numerical values of visual sensitivity by reach or section is discussed in Appendix X in Volume III of this EIR/EIS.

Table 4.15-1. Visually Sensitive Areas for the Guadalupe River Flood Control Project

Station Point/Location	Criteria for Sensitivity								Sensitivity Rating
	User Group				View Duration		Local Values		
	Residential	Recreational	Commercial	Commuter	Long Term	Short Term	High	Low	
Reach A									
475+00 to 510+00		H		L		L		L	6
510+00 to 525+00		H		L		L		L	6
525+00 to 581+00		H		L		L		L	6
Reach 6									
715+00 to 740+00	H			L	H	L		L	9
Reach 7									
740+00 to 745+00				L		L		L	3
745+00 to 755+00				L		L		L	3
755+00 to 775+00	H			L	H	L		L	9
775+00 to 780+00			M	L		L		L	5
Reach 8									
780+00 to 795+00	H			L	H	L	H		11
Reach 9									
795+00 to 810+00	H			L	H	L		L	9
810+00 to 840+00	H		M	L	H	L	H		13
Reach 10A									
840+00 to 855+00	H		M	L	H	L	H		14
Reach 10B									
855+00 to 870+00				L		L		L	3
870+00 to 885+00	H	H		L	H	L		L	12
Reach 10C									
885+00 to 910+00		H	M	L		L		L	8
Reach 11A									
910+00 to 925+00	H		M	L	H	L	H		13
925+00 to 935+00	H	H		L	H	L	H		14
Reach 11B									
935+00 to 950+00	H	H		L	H	L	H		14

Table 4.15-1. Continued

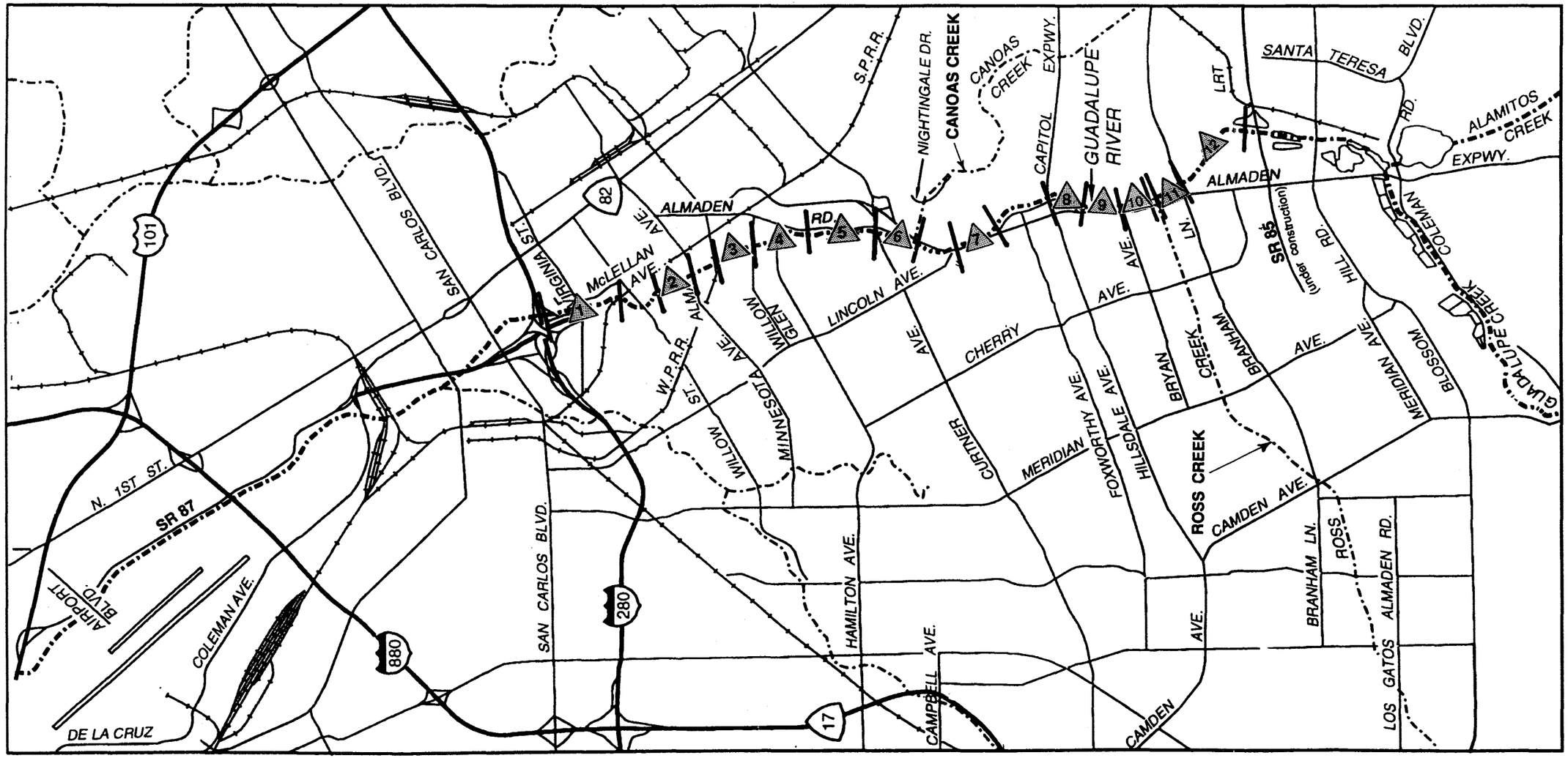
Station Point/Location	Criteria for Sensitivity								Sensitivity Rating
	User Group				View Duration		Local Values		
	Residential	Recreational	Commercial	Commuter	Long Term	Short Term	High	Low	
Reach 11C									
950+00 to 960+00	H	H	M	L	H	L	H		16
Reach 12									
960+00 to 985+00	H	H	M		H	L		L	13
985+00 to 1020+00		H	M	L		L		L	8
Tributaries									
Ross Creek				L		L		L	3
Canoas Creek				L		L	H		6

Notes: H = high; M = medium; L = low.

Shading indicates visually sensitive areas.

Each category (user group, view duration, and local values) was assigned a rating of "high", "medium", or "low" by station point, depending on its visual sensitivity. High was considered the most visually sensitive, medium was moderately sensitive, and low was the least sensitive. If a category did not apply to a particular area (e.g., Reach 8 has no commercial development), the station point was not assigned a rating. Numerical values were assigned as follows: high = 3, medium = 2, and low = 1. Numerical values were added to equal the sensitivity rating. Station points with sensitivity ratings of 9 or more were classified as visually sensitive areas. Figure 4.15-33 identifies the visually sensitive areas along the Guadalupe River.

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Reach	Symbol	Station Points
Reach 6:	1	715+00 to 740+00
Reach 7:	2	755+00 to 775+00
Reach 8:	3	780+00 to 795+00
Reach 9:	4	795+00 to 810+00
	5	810+00 to 840+00
Reach 10A:	6	840+00 to 855+00

Reach	Symbol	Station Points
Reach 10B:	7	870+00 to 885+00
Reach 11A:	8	910+00 to 925+00
	9	925+00 to 935+00
Reach 11B:	10	935+00 to 942+00
Reach 11C:	11	950+00 to 960+00
Reach 12:	12	960+00 to 985+00

N

0 3000 6000

Scale in Feet

Upper Guadalupe River Flood Control Project

Figure 4.15-31.
Visually Sensitive Areas

Jones & Stokes Associates
2600 V Street, Suite 100
Sacramento, CA 95818

Preferred Project

Table 4.15-2 lists adverse visual impacts and associated mitigation measures. Impacts in each reach are identified and site-specific details on implementing the mitigation measures in visually sensitive areas are provided.

Beneficial Impacts

In general, the preferred project, with mitigations described in the "Vegetation" section would provide for more contiguous riparian habitat along the upper Guadalupe River and provide for additional opportunities for views of this habitat. The preferred project also provides opportunities for opening the river corridor to a public trail system.

Impact V/A-1: Reduced Visual Quality from Construction-Related Activities. Construction-related activities in visually sensitive areas of the stream corridor would reduce the visual quality of these areas. Activities that reduce visual quality include earthwork activities (e.g., clearing, grading, and excavating); building flood control features; siting temporary offices, fences, sanitary facilities, and other structures; building temporary access roads; and establishing staging areas to store equipment, construction materials, excavated material, and debris. These activities would reduce the visual quality of visually sensitive areas of the corridor by substantially reducing its intactness, vividness, and unity. Impacts of construction-related activities would terminate following completion of construction, removal of equipment and materials, and cleanup of storage and construction areas.

This impact is considered significant for the period that construction activities are occurring because visual quality of visually sensitive areas of the stream corridor could be affected substantially.

Impact V/A-2: Removing or Substantially Reducing Views of Important Vegetation. Removing vegetation from the stream corridor would reduce the availability of views of mature vegetation that viewers find attractive. Views of streamside vegetation are scarce in the highly urbanized area adjacent to the Guadalupe River. Vegetation provides visual continuity in urbanized areas and softens engineered and architectural forms, lines, and textures. Vegetation produces high ratings of visual intactness, vividness, and unity along the corridor. This impact is considered significant because removing important views of vegetation, especially mature vegetation, would substantially reduce visual intactness, unity, and vividness in visually sensitive areas of the stream corridor.

Impact V/A-3: Increased Visibility or Viewer Awareness of Visually or Aesthetically Incongruous Elements from Removing or Reducing Screening Vegetation. Much of the vegetation in the stream corridor screens low-quality views of facilities such as parking lots, storage areas, service areas, garages, streets and freeways, and other similar elements of urban development. Reducing or removing from the stream corridor vegetation that provides actual or perceived screening of visually incongruous elements would substantially reduce visual intactness and unity and overall visual quality in visually sensitive areas of the corridor.

Table 4.15-2. Summary of Adverse Visual Impacts and Mitigation Measures by Reach for the Preferred Project and the Minimize Vegetation Impacts Alternative

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
		PREFERRED PROJECT	
Reach 6			
715+00 to 740+00 (see Figure 4.15-12)	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing gabion-lined banks	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings	Provide planting pockets 15 feet on center in areas of high visibility between station points 716+00 and 722+00,726+00 and 730+00, and 732+00 and 740+00 on east bank of bypass channel[a]
	Degradation of the natural-appearing character of the river corridor from introducing bypass channel entrance and exit structures	Maintain natural-appearing views of the river corridor	Plant vining vegetation in gabion planting pockets on west bank of bypass channel between station points 719+00 and 725+00[b] Providing planting pockets will screen postproject views between existing street trees and in narrow strips near the bypass channel; planting vining vegetation will blend gabion-lined banks with vegetation on the opposite bank and maintain natural-appearing views of the river corridor (see Figure 4.15-13)

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 7			
755+00 to 775+00 (see Figures 4.15-14 and 4.15-16)	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing a gabion-lined bank (see Figure 4.15-17) Degradation of the natural-appearing character of the river corridor from introducing an earthen bypass channel	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Maintain natural-appearing views of the river corridor	Provide cluster plantings randomly between station points 758+00 and 773+00 on east bank of bypass channel[c] Provide cluster plantings on west bank of bypass channel between station points 766+00 and 773+00[c] Implementing this measure would maintain natural-appearing views of both banks and undulate vegetative lines as viewed from Alma Avenue and LRT parking lot (see Figures 4.15-15 and 4.15-18)

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 8			
780+00 to 795+00 (see Figures 4.15-19 and 4.15-22)	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing gabion-lined banks (see Figures 4.15-20 and 4.15-23) Removing or substantially reducing views of important vegetation from loss of urban forest vegetation Increased visibility or viewer awareness of visually or aesthetically incongruous elements from removing or reducing screening vegetation and houses from introducing the bypass channel Degradation of the aesthetic character of the river corridor for viewers in or near the corridor from loss of urban forest vegetation Degradation of the natural-appearing character of the river corridor from introducing an earthen bypass channel	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Reestablish views of vegetation of high visual interest or aesthetic value Maintain natural-appearing views of the river corridor	Provide planting pockets 15 feet on center along east bank of bypass channel for entire reach[a] Implementing this measure would provide infill vegetative screening under the existing street tree canopy (see Figures 4.15-21 and 4.15-24)

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 9			
795+00 to 840+00	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from gabion-lined banks and cribwall Removing or substantially reducing views of important vegetation from loss of riparian vegetation Degradation of the natural-appearing character of the river corridor from introducing the bypass channel and floodway	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Reestablish views of vegetation of high visual interest or aesthetic value Maintain natural-appearing views of the river corridor	Plant native flowers, vines, and groundcovers in cribwall[d] Provide planting pockets 15 feet on center in gabions on west bank at end of Pine Avenue and on the east bank south of Willow Glen Way Bridge for 100 feet[a] Implementing these measures would screen views of the engineered lines of the cribwall and gabion-lined banks, reestablish views of vegetation of high visual interest or aesthetic value, and maintain views of the natural-appearing river corridor
810+00 to 840+00	Increased visibility or viewer awareness of visually or aesthetically incongruous elements from removing or reducing screening vegetation caused by loss of riparian vegetation	Screen views of visually incongruous elements resulting from project implementation	Plant native flowers, vines, and groundcovers in cribwall on east bank[d] Implementing this measure would screen views of the engineered lines of the cribwall

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 9, continued			
820+00 to 830+00	Degradation of the natural-appearing character of the river corridor from the loss of riparian vegetation	Screen views of visually incongruous elements resulting from project implementation	Plant native flowers, vines, and groundcovers in cribwall on east bank[d]
		Reestablish views of vegetation of high visual interest or aesthetic value	Provide planting pockets from Malone Road to station point 827+00 on west bank[a]
			Provide planting pockets on west bank of floodway between station points 826+00 and 830+00[a]
			Implementing these measures would screen views of the engineered lines of the cribwall and gabion-lined banks, reestablish views of vegetation of high visual interest or aesthetic value, and maintain views of the natural-appearing river corridor

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 10A			
840+00 to 855+00 (see Figures 4.15-25 and 4.15-27)	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing a cribwall (see Figure 4.15-28) Removing or substantially reducing views of important vegetation from loss of riparian vegetation Increased visibility or viewer awareness of visually or aesthetically incongruous elements from removing or reducing screening vegetation from introducing views of businesses on the east bank and the floodway Degradation of the natural-appearing character of the river corridor from loss of riparian vegetation	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Reestablish views of vegetation of high visual interest or aesthetic value	Plant native flowers, vines, and groundcovers in cribwall[d] Implementing this measure would screen views of the engineered lines of the cribwall and blend the cribwall with existing vegetation; reestablishing views of vegetation of high visual interest or aesthetic value would be accomplished by planting riparian forest trees on the toe of the east bank (see Plate V-47 from the "Vegetation" chapter)

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 10B			
870+00 to 885+00	The preferred project is not expected to result in adverse impacts to this portion of Reach 10B as little or no vegetation or views of vegetation will be affected. The preferred project will provide additional natural habitat and views.	None	None
Reach 11A			
925+00 to 935+00 (see Figure 4.15-30)	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing gabion-lined banks Removing or substantially reducing views of important vegetation from the loss of riparian vegetation Degradation of the natural-appearing character of the river corridor from steepened banks	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Reestablish views of vegetation of high visual interest or aesthetic value Maintain natural-appearing views of the river corridor	Provide planting pockets 15 feet on center on east bank in proposed gabions between station points 923+00 and 935+00[a]. Plant screening vegetation along the 2:1 slopes of the bypass channel and plant vining vegetation in gabion planting pockets below access ramp adjacent to Capitol Expressway [b]. Implementing this measure would screen view of the gabion-lined banks from residents and provide a more riverine environment for pedestrians

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 11B			
935+00 to 950+00	Degradation of the natural-appearing character of the river corridor from west bank widening	Screen views of visually incongruous elements resulting from project implementation	Upland forest revegetation would provide top-of-bank screens on east bank
	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements	Blend new or altered structures with their surroundings	Plant native flowers, vines, and groundcover in cribwall[d]
	Removing or substantially reducing important views of important vegetation from the loss of riparian vegetation	Reestablish views of vegetation of high visual interest or aesthetic value Maintain natural-appearing views of the river corridor	Reestablishing views of vegetation of high visual interest or aesthetic value and providing more riverine environment for pedestrians and residents would be accomplished by planting riparian forest trees on the west bank bench and screening trees on the top of west bank
	Degradation of the natural-appearing character of the river corridor from steepened banks		

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 11C			
950+00 to 960+00	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing cribwall Removing or substantially reducing important views of important vegetation from the loss of riparian vegetation Increased visibility or viewer awareness of visually or aesthetically incongruous elements from removing or reducing screening vegetation caused by construction of a floodway Degradation of the natural-appearing character of the river corridor from introducing a floodway	Screen views of visually incongruous elements resulting from project implementation Blend new or altered structures with their surroundings Reestablish views of vegetation of high visual interest or aesthetic value Maintain natural-appearing views of the river corridor	Plant native flowers, vines, and groundcover in cribwall[d] Reestablishing views of vegetation of high visual interest or aesthetic value and providing more riverine environment for pedestrians and residents would be accomplished by planting riparian forest trees on west bank bench Implementing this measure would screen views of the cribwall from residents and provide a more riverine environment for pedestrians

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 12			
960+00 to 985+00	The preferred project is not expected to result in adverse impacts to this portion of Reach 12 as little or no vegetation or views of vegetation will be affected. The preferred project will provide additional natural habitat and views.	None	None
	MINIMIZE VEGETATION IMPACTS ALTERNATIVE (Impacts are the same as the Preferred Project except as noted below.)		
Reach 9			
795+00 to 840+00	Potential for reduced visual quality by removing structural elements and introducing engineered improvements from construction of a bypass channel	Screen views of visually incongruous elements resulting from project implementation	Plant infill trees along east side of streets adjacent to bypass channel
Reach 10A			
840+00 to 855+00	Potential for reduced visual quality by removing structural elements and introducing engineered improvements from construction of a bypass channel	Screen views of visually incongruous elements resulting from project implementation	Plant infill trees along east side of streets adjacent to bypass channel

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application
Reach 10B			
880+00 to 885+00	Reduced visual quality by removing or replacing structural elements or introducing visually incongruous structures and engineered improvements from introducing the invert of the bypass channel.	Screen views of the visually incongruous elements resulting from project implementation	Plant screening vegetation along the top of bank on the east side of the bypass invert.
Reach 11A			
917+00 to 945+00	Potential for reduced visual quality by removing structural elements and introducing engineered improvements from construction of a bypass channel	Screen views of visually incongruous elements resulting from project implementation	Plant infill trees along east side of streets adjacent to bypass channel Provide riparian infill planting along east and west bank Plant groundcover on banks of bypass

Table 4.15-2. Continued

Visually Sensitive Area	Impact	Mitigation Measure	Site-Specific Application

Notes: Refer to text for complete description of impacts and mitigation measures.

[a] Planting pockets consist of small trees and tall shrubs planted in soil pockets in the gabions. The pockets will be spaced approximately 15 feet on center and located in the top one-third of the gabion slope. This spacing provides reasonable canopy cover within 5 years for riparian trees such as willow, cottonwood, box elder, and oak.

[b] Vining vegetation, consisting of native vine plants, such as blackberry and wildrose, will be planted in the gabions. The plantings will be spaced approximately 10 feet on center and located in the top one-third of the gabion slope.

[c] Cluster plantings are planting pockets spaced 15 feet on center in clusters of 10 or more in the upper one-third of the gabions. The clusters will be no more than 100 feet apart (see Figure 4.15-32).

[d] Native flowers, vines, and groundcovers will be planted in openings in the cribwall. The vines and groundcovers will be spaced approximately 10 feet on center with interplantings of flowers for the entire cribwall.

This impact is considered significant because increasing visibility or viewer awareness of lower quality views would reduce visual unity and intactness and overall visual quality in visually sensitive areas of the stream corridor.

Impact V/A-4: Degradation of the Natural-Appearing Character of the River Corridor. Natural-appearing river corridors are a unique visual resource in urbanized areas of the Santa Clara Valley. The addition of flood control structures and the removal of mature vegetation in some areas would degrade the natural-appearing aesthetic character of the river corridor.

The existing natural, irregular, and meandering lines of the streamcourse and the undulating forms of streambanks would be replaced by more regular engineered curves and straight lines. In some areas, widening the channel and increasing the steepness of side slopes would broaden the stream corridor cross section, creating a more open appearance that would substantially alter the stream's present topographic character. Some landforms, such as drainages, berms, and side slopes of channels, help to blend structural elements with their surroundings and contribute to the corridor's aesthetic character and visual quality. Removing or substantially altering these landforms would reduce the visual intactness and unity of some areas.

Removal of mature vegetation in visually sensitive areas along the stream corridor would result in reduced shade, increased temperatures, possible decreased winter temperatures, reduced wind buffering, increased diurnal temperature variations, increased glare, decreased humidity, and reduced noise attenuation (real and perceived). The overall effect of vegetation removal would be to degrade the general aesthetic character of a scarce resource, including reducing comfort levels (real and perceived) for users in or near the river corridor.

This impact is considered significant because implementing the project could substantially reduce viewers' aesthetic perceptions of visually sensitive areas of the river corridor.

Impact V/A-5: Reduced Visual Quality by Removing or Replacing Structural Elements or Introducing Visually Incongruous Structures and Engineered Improvements. New structures and engineered improvements in visually sensitive areas of the stream corridor could introduce built elements differing substantially from and contrasting with existing natural visual elements in terms of form, line, color, and texture. Introduction of substantially different and contrasting elements would reduce the visual character and quality of visually sensitive areas of the corridor by reducing the intactness and unity of these areas. Intactness and unity would be affected by the introduction of more regular engineered forms and lines that would contrast with the more irregular and natural forms and lines of the existing vegetation and topography of the corridor. The varied and seasonally changing colors of the existing vegetation and ground surface would be replaced by the more staid and seasonally static colors of structural elements. Diverse textural patterns of vegetation and surfaces along streambanks would be replaced by more even-textured patterns of materials and surface treatments.

Some of the structural elements (e.g., Willow Glen bridge in Reach 8) and landforms existing in and adjacent to the corridor contribute to the corridor's aesthetic character and are of high visual quality. Such structures generally have a rustic or historical character and are of a

form or scale or have textural qualities that closely link them with their surroundings in the corridor and adjacent neighborhood areas. Removing or replacing these structural elements in visually sensitive areas of the corridor would substantially reduce visual intactness and unity and overall visual quality.

This impact is considered significant because introducing visually incongruous elements would substantially reduce the visual quality (intactness and unity) of important elements in visually sensitive areas of the stream corridor.

Mitigation Measures

Table 4.15-2 lists visual impacts and associated mitigation measures. Impacts in each reach are identified and site-specific details on implementing mitigation measures in visually sensitive areas are provided.

Mitigation Measure V/A-1a: Locate Staging and Storage Areas Outside Visually Sensitive Areas. The District would locate staging, heavy equipment storage, and construction material storage areas outside visually sensitive areas (identified in Table 4.15-1) where feasible. If staging areas cannot be located outside visually sensitive areas, the District would screen these areas from general viewing. Screening may be accomplished using natural wood fencing (minimum 5-foot-high) or other natural-appearing screening material that effectively screens views of equipment storage areas.

Mitigation Measure V/A-1b: Minimize Areas of Surface Disturbance by Minimizing Clearing and Grading. The District would minimize areas of surface disturbance by minimizing clearing and grading. Existing trees and other vegetation would be protected and left undisturbed, wherever possible. Grading would minimize erosion and conform to the natural topography, wherever possible. (Also, refer to Mitigation Measure WQ-1 in Section 4.3, Water Quality, which recommend that the District prepare and implement a Storm Water Pollution Prevention Plan.)

Mitigation Measure V/A-1c: Restore Graded Areas to Original Contours and Revegetate Cleared Areas. The District would revegetate cleared areas and restore graded areas as closely as possible to their original contours (refer to Mitigation Measure V-1 in Section 4.12, Vegetation, which recommends that the District prepare and implement an integrated vegetation mitigation plan). Site-specific restoration plans would be included in the mitigation plan for the project, which would be prepared following public review of the Draft EIR/EIS.

Mitigation Measure V/A-2: Reestablish Views of Vegetation of High Visual Interest or Aesthetic Value. The District would reestablish views of vegetation of high visual interest or aesthetic value that have been removed in visually sensitive areas as part of project implementation. Vegetation would be established that is typical of native riparian and closely associated plant communities in California, provides high visual interest, is locally scarce or unique, and is considered to be of high aesthetic value locally (e.g., valley oaks, coast live oaks, sycamores, toyon, and cottonwoods).

Mitigation Measure V/A-3: Screen Views of Visually Incongruous Elements Resulting from Project Implementation. The District would screen views of visually incongruous elements in visually sensitive areas resulting from project implementation. The District would establish vegetation of mixed height, using locally native riparian species wherever feasible. Vegetation would be established using trees that reach a height of at least 20 feet in ten years and shrubs and small trees that would reach a height of at least 6 feet in five years. Vegetation with foliage present would effectively achieve a minimum of 50 percent screening in five years and 75 percent screening in ten years.

Visual treatments that apply to this measure are the same as those described below for Mitigation Measure V/A-4.

Mitigation Measure V/A-4: Maintain the Natural Character of the River Corridor. The District would maintain natural-appearing views of the river corridor by breaking up straight lines and regular engineered forms to soften their impact. This would be accomplished by using materials with colors and textures that commonly occur in natural river corridors of the region along the Guadalupe River and channel banks.

Visual treatments would include:

- Planting native flowers, vines, and ground covers in openings in crib walls to soften the engineered lines. The vines and ground covers would be spaced approximately 10 feet on center with interplantings of flowers on the entire crib wall.

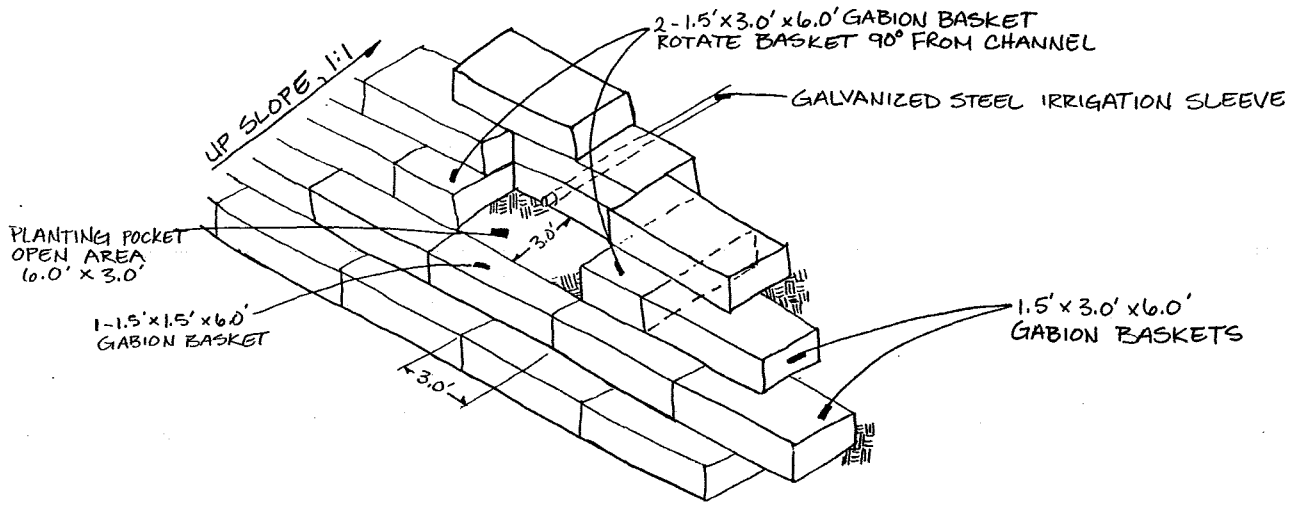
- Planting native ruderal vines and brambles in gabion walls to soften the engineered lines. The plantings would be spaced approximately 10 feet on center and located in the top one-half of the gabion slope.

- Planting pockets. Planting pockets would be 3 feet wide by 6 feet long and contain one small native tree or tall native shrub and two blackberry thickets (Figure 4.15-32). Planting pockets would be used to screen undesirable views, as follows:

  - 15 feet on center. Planting pockets would be located 15 feet on center in the upper one-third of the gabion wall, for the entire section described. This spacing would provide reasonable canopy cover within 5 years for riparian trees such as willow, cottonwood, box elder, and oak.

  - Cluster plantings. These planting pockets would be located 15 feet on center in clusters of 10 or more in the upper one-third of the gabion wall. The clusters would be no more than 100 feet apart. Clustering planting pockets would provide undulation of the vegetative line when viewed down the channel from a bridge (Figure 4.15-32).

  - Top-of-bank screens. Native evergreen trees and shrubs would be planted at the top of bank in appropriate areas. The plants would be spaced no more than 8 feet on center, and the planting area would be at least 16 feet wide.



PLANTING POCKET DETAIL

NTS SPACE AT EVERY 15 FEET

NOTE:

STAGER ELEVATIONS OF PLANTING POCKETS ON GABION SLOPE.

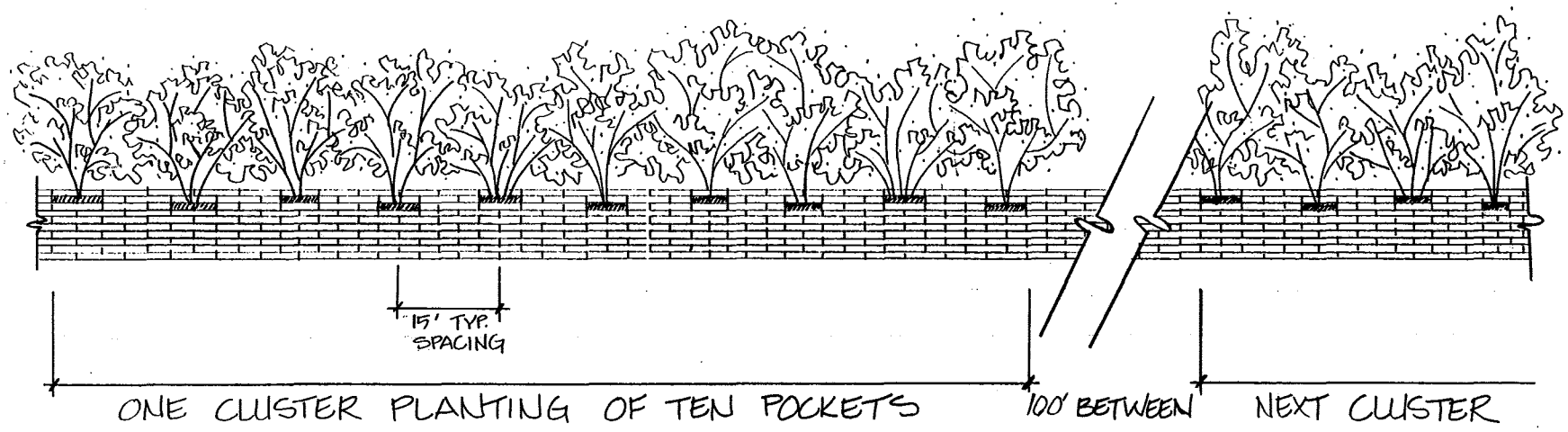


Figure 4.15-32. Planting Pockets Detail

Mitigation Measure V/A-5: Blend New or Altered Structures with Their Surroundings. The District would blend new structures or alterations to existing structures with their surroundings by using forms, lines, colors, and textures that are consistent with the surroundings. Subdued tones (e.g., shades of brown, tan, and gray) would be used for structures. Textures would generally be coarse and varied. Smooth or shiny surfaces and white or other bright colors would not be used. Forms and lines would be broken up to avoid straight edges and forms that are out of scale with their surroundings. Successful implementation of this measure would reduce this impact to a less-than-significant level.

Residual Impacts After Mitigation

Potential impacts to visual and aesthetic quality could be mitigated to a level of insignificance by successful implementation of the recommended mitigation measures in this section of the EIR/EIS. After mitigation, the project would improve access by providing an easement for maintenance crews. In addition, successful implementation of mitigation measures for loss of vegetation would provide a net long-term increase in habitat quality along the Guadalupe River because all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants) would be replaced with native species and a net gain of riparian forest and wetland acreages would result.

Minimize Vegetation Impacts Alternative

Visual impacts for the Minimize Vegetation Impacts Alternative would be similar to those for the Preferred Project, but they would affect fewer visually sensitive areas in Reaches 9-10A and 11A. Visual impacts in Reach 10B would be greater under the Minimize Vegetation Impacts Alternative.

Differences in visual impacts between the Minimize Vegetation Impacts Alternative and the Preferred Project are described below. Impacts and mitigation measures for the Minimize Vegetation Impacts Alternative are specified in Table 4.15-2. Reaches not discussed contain no visually sensitive areas or would experience the same impacts as under the Preferred Project.

Reach 9. Under the Preferred Project, visual impacts in Reach 9 would result from the construction of a bypass channel and floodway between station points 795+00 and 810+00 and station points 820+00 and 840+00. Impacts would also result from the recontouring and gabion lining (or crib wall) of the east bank between station points 810+00 and 820+00, and gabion lining of the west bank for approximately 200 feet at the end of Pine Avenue and between station points 820+00 and 830+00.

Under the Minimize Vegetation Impacts Alternative, visual impacts in Reach 9 would result from the construction of the bypass culvert outlet, a short section of channel widening between Willow Glen Way and the culvert, and gabion lining of the west bank for approximately 200 feet at the end of Pine Avenue and between station points 825+00 and 830+00. The impacts would occur between station points 795+00 and 805+00 and 825+00 and 830+00.

Reach 10A. Under the Preferred Project, visual impacts in Reach 10A would result from the construction of a floodway on the east bank from station point 840+00 to 855+00.

Under the Minimize Vegetation Impacts Alternative, visual impacts in Reach 10A would result from the construction of the bypass culvert inlet and gabion lining of the east bank between station points 853+00 and 855+00.

Reach 10B. Under the Preferred Project, visual impacts in Reach 10B would not occur. Impacts would occur in Reach 10B under the Minimize Vegetation Impacts Alternative as a result of the construction of the invert of the bypass channel on the east bank between station points 880+00 and 885+00.

Reach 11A. Under the Preferred Project, visual impacts in Reach 11A would result from the construction of a floodway and gabion lining of the east bank between station points 925+00 and 937+00. The east bank would also be gabion lined between station points 910+00 and 915+00.

Under the Minimize Vegetation Impacts Alternative, visual impacts in Reach 11A would result from the construction of a bypass channel east of the natural channel. The natural channel would remain undisturbed except for the bypass channel outlet in the vicinity of station 920+00.

No-Project Alternative

Under the No-Project Alternative, construction-related impacts on visual resources would not occur. The cleanup of substantial amounts of concrete rubble and commercial and household debris in the project area would not be conducted and the District would continue to have limited access and easements to the stream. No new structures or views would be introduced, and no existing structures or views would be removed. Effects on visual resources from operation and maintenance procedures would probably not change.

4.16 HISTORIC AND ARCHEOLOGICAL RESOURCES

Affected Environment/Setting

Methods

An archival search was completed to determine if cultural resources exist within the project area. Significant cultural resources present in the project area are primarily prehistoric, although there is also an historic component. Subsurface testing conducted in 1990 included six prehistoric archaeological sites and one historic site in the vicinity of the project area. Buildings within the Preferred Project area were evaluated in 1990 for their historic significance based on local, state, and federal guidelines. That same year architectural evaluation forms for structures in the Preferred Project Alternative were prepared. In addition to the archival research, in 1996 an updated surface reconnaissance was conducted. This survey included field inspection of native soils and recently exposed or disturbed soils in the vicinity of the project area along Guadalupe River, Canoas Creek, and Ross Creek. A cursory visual evaluation was completed by Archaeological Resource Management of additional structures proposed for demolition in the Minimize Vegetation Impacts Alternative. The Minimize Vegetation Impacts Alternative includes additional structures which would need formal historic and architectural evaluations should the plan be implemented.

Prehistoric

The areas adjacent to the Guadalupe River were inhabited by Native American peoples for a long period of time. These peoples are referred to as the Ohlone, or Costanoan (Spanish for "people of the coast"), and they inhabited the San Francisco Bay regions from the Golden Gate south to Monterey. It is believed that the Ohlone Indians inhabited the area since A.D. 500 (Levy 1978). The Ohlone were gatherers and hunters who used native flora and fauna with the exception of one domesticate, the dog. The abundance and high quality of natural resources in the San Francisco Bay Area allowed them to settle in semi-sedentary villages. The proximity of both mountainous and bay regions in the Santa Clara Valley made a diversity of resources available to the native inhabitants during different seasons. Archaeological remains found within the project area reflect the Native American adaptation to this diverse environmental area.

It is thought that contrary to usual conceptions of hunters and gatherers, native Californian groups, including the Ohlone, practiced a form of resource management that was close to agriculture. Bean and Lawton (1976) consider this pattern a "semi-agricultural" stage which included quasi-agricultural harvesting activity and proto-agricultural techniques. Some plants were pruned and reseeded seasonally for optimal production. Foods such as acorns were stored for many months at a time. The acorn was a primary food source, abundant in autumn and easily stored for the remainder of the year. According to Gifford, the acorn industry of California was probably the most characteristic feature of its domestic economy (Gifford 1951). Other important resources include various plant foods, land animals, and the marine resources of the San Francisco Bay. Both large and small land mammals were

hunted, trapped or poisoned. Many items, including shell beads and ornaments, were extensively traded with other groups as far away as the Great Basin of Nevada (Davis 1974).

Bean and Lawton (1976) also claim that the abundance of plant and animal resources in California, and the development of ingenious technological processes, allowed Native Californians to develop social structures beyond the normal parameters of hunting and gathering. These include extensive political systems, controlled production and redistribution of goods, and alliances and trade with other groups.

The first firmly dated habitation site of the Santa Clara Valley was established approximately 6400 years B.P. (before present) at CA-SCL-64 along Alamitos Creek and Palm Canyon (Winter 1977, Cartier 1980). Few sites are known prior to the Early Period which stretched from approximately 5000 to 3000 years B.P. However, the vast majority of prehistoric sites in the Santa Clara Valley are located along the valley's creek systems and date within the Middle Period which extended from approximately 3000 to 1000 years B.P. There were a lesser number of sites found in the Late Period which dated between 1000 B.P. to contact with the European explorers in the eighteenth century (Cartier et al 1993).

Historic

The hydrology of the Santa Clara Valley has been the key to the settlement and distribution of population from prehistoric times. The major water courses in this area included the Guadalupe River, Coyote Creek, Canoas Creek, and Los Gatos Creek. This study focuses on the Guadalupe River and its relationship to the development in the area south of San Jose. Before recent flood control projects were constructed on the lower portions of the River, sheetflooding was a common occurrence in the Willow Glen area during winter rains. This flooding process buried many prehistoric archaeological sites under feet of alluvial sediment and created seasonal freshwater marshes inhibiting early historic settlement. The hydrological conditions that were first encountered by the early Spanish/Mexican and Euro-American settlers in the area have been altered due to the modifications made to the river and its tributaries during the late nineteenth and twentieth centuries. These modifications are important in understanding the historical development along the river and the historical resources found within the project area. Historic resources potentially affected by the project include residential and industrial structures, bridges, and early flood control features. Residential development along the river banks has resulted in the most abundant of the historical resources within the subject area. These resources are described below for each reach of the project.

Cultural Resources By Sub-area Within The Project Area

Reach A. During the archival research, no sites were identified within or adjacent to Reach A; however, archaeological sites do exist within a half mile radius of Reach A. A prehistoric site, SCL-478, was recorded by Dr. Richard Ambro and Billy Peck in 1980 approximately 1200 feet east of the Guadalupe River, 330 feet northeast of the intersection of Technology Drive and Sonora Avenue. A mano was identified in association with Native American cooking stones (fire-cracked rock). Traces of prehistoric materials (fire-cracked rock and a groundstone fragment, a possible mano or metate) were identified in the southern portion of

Reach A near Ferrari Street and Guadalupe Expressway during a previous surface survey (Cartier 1989).

Reach 6. One prehistoric site, SCL-706, was identified directly adjacent to Reach 6 east of the Guadalupe River on the east side of McLellan Avenue south of Virginia Street. This area is sensitive for possible pockets of prehistoric deposits as found during the testing in 1990 for the Guadalupe River Evaluation. Several test units were placed in this area; however, placement of test units and trenches was significantly hindered by the intense residential development along McLellan Avenue.

Three test units were placed in the yard of a residence on McLellan Avenue revealing traces of a prehistoric cultural deposit, which included *Olivella* shell and historic pottery fragments. The deposit reached a depth of about 60 cm and had a high degree of historical contamination. Due to the intense development it is impossible to determine at this time the extent and significance of the subsurface remains of the site. This prehistoric resource has undefined limits and the possible presence of human burials is uncertain.

Fifty-three residential units located on Grant Street, Palm Avenue, Harliss Street, McLellan Avenue, and West Virginia Street would be removed for the project in Reach 6. The area west of Palm Avenue was not subdivided and developed until the early decades of the twentieth century. Although most of the structures in this reach are typical examples of late nineteenth and early twentieth century architecture, the historic characteristics of the neighborhood has been affected by modern intrusions. The residences affected by the Flood Control Project do not, by themselves, constitute an historic district nor make a significant contribution to a larger historic district; however, structures have minor architectural interest.

Two bridges that cross over the Guadalupe River in Reach 6 were evaluated in 1990 for historical or engineering significance. The West Virginia Street bridge was designed by William Lotz, and built around 1920-30. This two lane concrete girder bridge has two spans and a slight arch. The second bridge is a single track Southern Pacific Railroad crossing built in 1917 (C-1293). This railroad was constructed of timber and concrete girders with steel. Both structures lack significant historical or engineering merit.

Reach 7. In 1990, a large prehistoric village/cemetery site, CA-SCL-690, was identified on a low terrace east of the bank of the Guadalupe River near the SPRR tracks 600 feet east of Reach 7. Archaeological investigations, conducted by Caltrans and San Jose State University, indicate an approximate age range of AD 720 and AD 1270 with the bulk of the dates near AD 1000. Cultural material found at the site included shell beads and pendants, manos, mortars and pestles, projectile points, a bone whistle, shell, and other artifactual and non-artifactual material (Carter et al 1993).

There are seven commercial/industrial structures located on Willow and Lelong Streets that would be removed for the project. One of the commercial structures dates from the 1920s; however, the balance were constructed in the 1950s and 1960s. The c1925 commercial building at 445 Willow Street is a one-story concrete structure with Spanish Eclectic details. It is not architecturally or historically significant.

The Union Pacific Railroad Trestle (bridge) crosses over the Guadalupe River near Padres Drive in Reach 7. This trestle consists of a single track with concrete abutments and steel railings. The railroad was originally constructed in this area during the early 1930s. The rails are dated at 1950. This trestle is not considered to have significant historical or engineering merit.

Reach 8. No prehistoric resources are known to exist within Reach 8. The twenty-three residences scheduled for removal within this reach were evaluated in 1990. The structures are located on Mackey Avenue, Dawson Avenue, and Northern Road. This area was subdivided in the early 1950s. None of these tract houses have significant historical or architectural merit.

Reach 9. Seven residential structures and two structures containing businesses that will be removed for the Flood Control Project in Reach 9 were evaluated in 1990. These structures are located on Guadalupe Avenue, Malone Road, and Old Almaden Road. Six structures on Guadalupe Avenue were constructed after 1948 when this portion of Willow Glen was subdivided for development. None of these tract houses have architectural merit. The structure at 760 Malone Road is a Queen Anne residence that dates to 1895-1900. The structure has been extensively altered and has limited architectural merit. The other structures on Malone Road and Old Almaden Road date to the 1920s and have no architectural or historical merit.

The Willow Glen Way footbridge was originally located at Lincoln Avenue on Los Gatos Creek and was moved to Willow Glen Way in 1956 when a new bridge was constructed on Lincoln Avenue. This footbridge over the Guadalupe River is a single span steel truss bridge with concrete footings on the river bank. The floor of the bridge is sheet iron and it has chain link on the sides. This bridge is not considered to have significant historical or engineering merit.

Reach 10. No prehistoric resources were found in this reach. The historic site, CA-SCL-635H, is a redwood retaining wall identified 35 feet east of the Guadalupe River near the top of the river bank. This historic site was first noted in a 1985 cultural resource evaluation of this area conducted by ARM (Cartier 1985). At that time the feature was believed to have been built to control erosion and it appears to be over 100 years old. The site was recorded by Basin Research Associates in 1987. No other archival information about this feature is available. In test excavations for the current study, it was found that the vertical redwood planks of the wall continue beyond a depth of 265 cm, and there was an historic waste component in the surrounding soils. It is likely that the feature is associated with flood control activities dating from the 1860s and 1870s. The age of this feature would contribute to its significance as a cultural resource.

Valley View Packing Company is located on Old Hillsdale Avenue in Reach 10 of the project area. This company was established in 1938 by the Rubino brothers and is a survivor of the rapidly disappearing fruit processing industry in the Santa Clara Valley.

Three resources associated with the Valley View Packing Company on Hillsdale Avenue are located within the project alignment: an industrial building, a residence, and an abandoned

prune dehydrator. Due to its representative character of the fruit packing era in Santa Clara County, it is considered significant under criterion "A" of the National Register. The Rubino residence and the prune dehydrator date to an earlier period of development. The Prairie-style Rubino residence was constructed by Pietro Rubino for his family in the early 1930s. Three generations occupied the house until 1974 when it was converted for use as company offices. Due to the structure's age, style, and historical association, it has moderate historical significance.

Reach 11. A prehistoric resource, SCL-636, is recorded within "40 feet southeast of the Guadalupe river," north of Wellington Square and Thousand Oaks Drive (Ogrey and Guedon 1987). SCL-636 is on the edge of the Preferred Alternative and within the proposed Minimize Vegetation Impacts Alternative. Exposed fire-cracked rocks and prehistoric stone tools were identified on the surface of the site. It appears that the observed artifacts represent only a portion of a site which may extend further under existing structures on private property. Widening of the east bank may have an effect on site SCL-636.

One historic structure was evaluated in this reach. This residence dates to 1956 and is not historically or architecturally significant.

Reach 12. At the time of the 1996 archaeological survey, agricultural land with planted row crops southeast of the future Chynoweth Avenue was identified, adjacent to the west bank of the Guadalupe River. A portion of the area was disced and free of crops. Surface visibility of the soils was good with good accessibility to the entire area. A large concentration of alluvial cobbles and gravel was observed on the surface with a medium brown clayish loam. No cultural material was noted. No known cultural resources would be affected by the project within Reach 12.

Guadalupe Blossom Hill Reach. A 1996 field survey of the area south of Blossom Hill Road to Coleman Road noted soil consisting of fill dirt and gravel. This portion of the Guadalupe River contained engineered levees and percolation ponds. The visibility was fair with no cultural material noted. No known cultural resources would be affected by the project within the Guadalupe Blossom Hill Reach.

Canoas Creek. There are no archaeological sites recorded in the project area. The closest prehistoric sites to the area of the Canoas Creek Reach are CA-SCL-294/124 and CA-SCL-674. A portion of CA-SCL-294/124 is located on Canoas Creek approximately 1,700 feet southeast of the channel. CA-SCL-674 is located in a prune orchard approximately 550 feet south of the Canoas Creek Reach, north of Hillsdale Boulevard and east of Almaden Expressway. In 1990, test excavations of SCL-294/124 and SCL-674 sought to determine the boundaries and contents within these resources.

CA-SCL-674 is a sparse prehistoric stone tool scatter with occasional dietary shells. Two human burials were recovered during archaeological monitoring for a sewer line (Reese, Ranz, and Quick 1988). Prehistoric artifacts were located in the upper levels of the test units in 1990.

CA-SCL-294/124 is a large occupation site characterized by human burials, dietary shell and bone, lithic artifacts, and shell beads. Test units placed within the project area on the

northern edge of the site in 1990 revealed the presence of significant cultural material. Artifacts were found to a depth of one meter in test units located within the midden area, indicating that much of the remains within the study area are relatively undisturbed.

During the 1996 survey, the field archaeologist noted Canoas Creek had engineered levees on both sides of the creek with fill gravel on the surface. The banks of the creek were covered with low seasonal grasses. The visibility of the soils was fair with good accessibility. The native soil consisted of a medium brown silty clay loam with no cultural materials noted. A large concentration of alluvial cobbles and gravel was observed on the surface with a medium brown clayish loan.

Ross Creek. The surface survey in 1996 examined engineered levees on both sides of Ross Creek with fill gravel on the surface. The banks of the creek were covered with low seasonal grasses. Visibility was fair with good accessibility to the creek, and no cultural materials were observed. There are no known cultural resources in Ross Creek that would be affected by the project.

Environmental Consequences/Impacts and Mitigation Measures

Significance of Impact

The project may have an adverse impact on cultural resources. The impact or adverse effect would occur if it would damage or disrupt prehistoric archaeological sites, an historic property, historic or culturally significant community, or an ethnic social group. Additionally, if the project were to create a conflict with established recreational, educational, religious or scientific uses of the area, significant cultural impacts might result.

Preferred Project

Construction Impacts

Impact AH-1: Excavation within the Project Area Could Disrupt or Destroy Archaeological Resources. Four reaches and a tributary in the Preferred Project are located in areas that may contain prehistoric cultural resources. These reaches include Reach A, Reach 6, Reach 7, and Reach 11.

Several prehistoric resources may be affected by the Preferred Project Alternative. Reach A may contain cultural resources potentially affected by the project based on prehistoric materials identified during a previous survey. Reach 6 of the project alignment is adjacent to a prehistoric archaeological site at 770 McLellan Avenue that has potential significance, CA-SCL-706. The parameters and depth of this site are not determined, but it is anticipated that soil-moving activities within this area may encounter additional archaeological deposits. Reach 7 of the project alignment is outside of the periphery of a large occupation site with human burials, CA-SCL-690. A portion of SCL-690 is located approximately 600 feet east of the Guadalupe River, in near vicinity to Reach 7. This prehistoric site, SCL-690, has high archaeological significance. In Reach 11, a prehistoric site is recorded 40 feet southeast of the existing bank of the Guadalupe River, CA-SCL-636. This cultural resource may be affected by the proposed construction. This site, CA-SCL-636, was identified by the

presence of fire-cracked rock and prehistoric stone tools. SCL-636 may be potentially affected by the Preferred Project Alternative from the widening of the east banks along the Guadalupe River in Reach 11.

Impact AH-2: Project Construction Would Result in Removal or Disturbance to Structures with Historical Significance. There are five historic structures that have some architectural value that would be removed by the Preferred Alternative Project. Reach 10 contains one historic resource, CA-SCL-635H, a redwood retaining wall of potential significance in excess of 100 years in age. In addition, the Valley View Packing Company historic complex in Reach 10 includes an abandoned prune dehydrator which dates to the early years of the company's operation. The prune dehydrator is an early prototype of a new hydrating process developed by the Rubino brothers in the late 1930s. Due to its association with the fruit processing industry in the Valley, it is a significant resource according to criterion "A" for the National Register. The Preferred Alternative may have an adverse impact on these resources. Within Reach 6, three structures of minor architectural significance would be removed: 334 Grant Street, 717 Palm Street, and 960 McLellan Avenue. In Reach 9, the structure at 760 Malone Road would be removed by the project. This residence dates to the 1890s and has some architectural value.

Mitigation Measures

Mitigation Measure AH-1: Monitor Construction Activities to Identify Archaeological Resources. To mitigate potential construction impacts, a qualified archaeologist should periodically monitor earthmoving construction activities to check soil conditions and to assess the presence of archaeological deposits in sensitive areas of the project. Archaeological monitoring of all soil-moving construction activities near sites CA-SCL-636, -690, and -706 should be conducted due to the likely presence of prehistoric deposits. Due to a prehistoric site, SCL-4778, located east of Reach A and traces of prehistoric materials identified during a previous archaeological survey of this reach, monitoring is recommended for the southern half of Reach A from Sonora Avenue to Interstate 880. As described in the site record, "the extent of the prehistoric site SCL-706 is unknown." Monitoring should be conducted on the southern portion of Reach 6, from south of West Virginia to Willow Street. Because of the extensive human remains found at SCL-690, it would be recommended a qualified archaeologist monitor the section of Reach 7 between Alma Avenue and Willow Street. In Reach 11, it would be recommended that monitoring should be conducted in the section from south of Capital Expressway to the south end of Wellington Square. Archaeological monitoring is also appropriate at SCL-635H (in addition to other mitigation measures) to document the depth and extent of this historic feature. In the event that archaeological materials or burials are discovered during monitoring, the following mitigation measures would be implemented.

- A qualified archaeologist would monitor all earthmoving activities within the potentially affected site areas. If historic resources are identified, the archaeologist would examine the find and make appropriate recommendations. Monitoring may be expanded to include the recovery of exposed artifacts or emergency salvage excavation. In the event, however, that prehistoric traces (human remains, artifacts, concentrations of shell/bone/rock/ash) are encountered, all construction within a

150-foot radius of the find would be immediately halted, and a qualified archaeologist would examine the find and make appropriate recommendations.

- If grading and trenching into an historic deposit takes place, then hand-excavation with analysis would be conducted, and findings documented and a report prepared. This excavation program would be implemented to gather data from portions of the project site where cultural resources are encountered during construction monitoring.

- The District would include a provision in the construction contract that requires that in the event cultural resources are discovered, the construction contractor would halt all work in the immediate vicinity of the find until a cultural resource consultant can implement appropriate mitigation measures. Archaeological excavation would expose or remove the deposits for analysis of documentation if construction excavation cannot be avoided at that location.

- Historic artifacts recovered during monitoring and any necessary excavation would be properly curated following guidelines established by 36 CFR Part 79 and the specific requirements established by the selected repository. Repositories for archaeological collections in the area include Sonoma State University Curation Facility.

- If significant remains are found, a qualified archaeologist would produce a report that thoroughly discusses the site with archival documentation, description, and analysis of archaeological findings. The report would be submitted to the Northwest Information Center of the California State Inventory.

Mitigation Measure AH-2: Preserve Historical Resources Where Possible; Document and Salvage Significant Elements Where Structural Demolition is Necessary. Four structures within the project alignment have some architectural value. These structures are 334 Grant Street, 693 and 717 Palm Street, 960 McLellan Avenue, and 760 Malone Road. The San Jose Historical Museum, Victorian Preservation Association, or other interested parties should be offered the opportunity to salvage architectural elements from these structures for use in the restoration of similar historic structures.

Three cultural resources associated with the Valley View Packing Company on Hillsdale Avenue should be preserved, if possible (an industrial building, a residence, and an abandoned prune dehydrator). Minimal mitigation would include photographic and archival documentation, oral interviews with the Rubino family, and salvage of significant elements.

Residual Impacts After Mitigation

If mitigation measures recommended in this EIR/EIS are successfully implemented, no residual historic and archaeological resource impacts would be anticipated.

Minimize Vegetation Impacts Alternative

Construction Impacts

Under the Minimize Vegetation Impacts Alternative a bypass channel would be constructed in Reaches 9, 10A, 10C, 11A, and 12. The proposed changes in the Minimize Vegetation Impacts Alternative affect most of the prehistoric resources more than the Preferred Project Alternative.

The Minimize Vegetation Impacts Alternative would lessen impact upon the historic site CA-SCL-635H, located in Reach 10. However, more structures would be affected as a result of the Minimize Vegetation Impacts Alternative. The structures proposed for removal within Reach 9 and on Curtner Avenue of Reach 10 were noted during the cursory visual evaluation as being constructed in the late 1940s to early 1950s. In Reach 10 on 892 El Rio Drive, one single-family residence appeared to be from the 1920s. Also in Reach 10, 916 El Rio Drive was observed as being worthy of particular architectural evaluation. On Roy Avenue in Reach 10, the four structures appeared modern, from the 1980s to the 1990s. The structures affected by the Minimize Vegetation Impacts Alternative in Reach 11 on Thousand Oaks Drive and Wellington Square all appeared to be constructed in the 1980s and 1990s. These more modern structures lack architectural merit. However, the removal of these structures may greatly impact the prehistoric site CA-SCL-636.

Mitigation Measures

The potential prehistoric archaeological effects of the Minimize Vegetation Impacts Alternative would be greater than the impact from the Preferred Project Alternative, except on the portion of the Guadalupe River designated Reach 11 in the near vicinity of SCL-636. The mitigation guidelines for the Minimize Vegetation Impacts Alternative would include a larger area to monitor. In Reach 11, the construction of the bypass channel and the removal of 33 structures may greatly affect SCL-636 due to the boundaries undefined below structures between Wellington Square, Thousand Oaks Drive, and the Guadalupe River. This may entail salvage recovery of the archaeological deposit.

Historic resource mitigations may be more extensive for the Minimize Vegetation Impacts Alternative due to removal of 115 structures in addition to those removed in Reaches 6-10 which are the same as described for the Preferred Project. In addition to salvaging the architectural elements from the five residential structures in the preferred alternative, other possible mitigation measures may be needed. If the Minimize Vegetation Impacts Alternative were selected, detailed historic evaluation of structures would be required. Prior to removal of the structures in Reaches 9, 10, and 11, historic evaluations would need to be completed for each structure slated for demolition. The evaluation would be designed to comply with Section 106 of the National Historic Preservation Act.

No-Project Alternative

Under the No-Project Alternative, no adverse cultural resource impacts would occur.

CHAPTER 5

CUMULATIVE IMPACTS

CHAPTER 5

CUMULATIVE IMPACTS

5.1 OTHER PROJECTS PROPOSED IN VICINITY OF GUADALUPE RIVER CORRIDOR

CEQA (section 15355) requires that the cumulative impacts of proposed projects be considered in an EIR. Cumulative impacts refer to two or more individual effects that, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of the project when added to other closely related past, present, and future projects. For the purposes of the Upper Guadalupe River Food Control Project considered in this environmental document, the projects contribution to overall impacts in the Guadalupe River corridor are considered. The cumulative loss of riparian habitat that has resulted from past projects in the Guadalupe River corridor is considered in the cumulative vegetation impacts analysis (refer to page 5-7 and to Tables 5.3 and 5.4). The potential cumulative impacts of currently approved present or future projects are discussed below.

Six major projects are proposed, approved, or under construction by other public agencies within the Guadalupe River system. The cumulative impact analysis considers the impacts of these projects along with the impacts of the proposed project. The major areas of potential cumulative impacts are vegetation, wildlife and fishery resources. Impacts on SRA habitat were not specifically addressed in the environmental analyses for the projects discussed below, except for the Downtown Guadalupe River Flood Control Project. Impacts on riparian habitat for other projects include some habitat that is adjacent to the Guadalupe River. Table 5.1 summarizes approximate incremental and cumulative acres of riparian habitat loss from these projects.

- The Guadalupe River Flood Control Project from I-880 to I-280. This project (the Downtown Guadalupe Project) will be constructed in three phases. Construction at the first reach (Hedding Street to I-880) began in August 1992. The project is expected to be completed in 1998.

  The U.S. Army Corps of Engineers (Corps), Sacramento District, prepared an Environmental Impact Statement (EIS) for the project in 1985. In January 1991, the Corps prepared an Environmental Assessment (EA) that incorporated some recreational aspects of the Guadalupe River Park Project (January 2, 1991) and

TABLE 5.1

DIRECT CUMULATIVE IMPACTS ON RIPARIAN HABITAT ON THE GUADALUPE RIVER MAINSTEM AND MITIGATION REQUIRED (ACRES)

	Impact	Mitigation
Total acreage of riparian habitat to be directly affected:		
Corps I-880 to I-280 and Guadalupe River Park (San Jose Redevelopment Agency)	15.3	22.5
Caltrans SR 87	4.54	7.29
District Highway 101 to I-880 and I-280 to Blossom Hill Road (preferred project)	9.48	18.97
Caltrans SR 85	0.1*	12.1
Guadalupe River Park South Corridor Master Plan (City of San Jose)	0.8	4.7
Total	29.9	64.9

* The project will directly affect 0.1 acre of riparian vegetation on the Guadalupe River mainstem offstream and indirectly affect 4.5 acres on Los Gatos and Ross Creeks. Mitigation for loss of riparian habitat requires planting 12.1 acres of riparian vegetation on site and 0.2 acre off site (Monette 1992).

habitat resulting from trail construction and recreational use. In 1992, the Corps prepared a final mitigation and monitoring plan to address project-related impacts. This plan is being revised to address a number of issues, including impacts on shaded riverine aquatic (SRA) habitat.

Project construction activities will eliminate 15.3 acres of riparian habitat and 25,000 square feet of potential anadromous salmonid spawning gravels. Wetlands and jurisdictional waters of the United States will not be affected. The project will affect approximately 9,800 linear feet of SRA habitat; however, impacts on SRA habitat and mitigation sites are being reevaluated. Other impacts include potentially elevated instream temperatures and anadromous salmonid staging/resting area losses.

Mitigation for the loss of riparian habitat requires planting 22.5 acres of riparian vegetation. For loss of potential spawning gravels in the project area, 25,000 square feet will be replaced and maintained. Mitigation for SRA habitat is being reevaluated. Mitigation measures for fish impacts including providing a low-flow channel and replacement of spawning gravels.

A 10-year mitigation evaluation will determine the success of mitigation measures and whether additional corrective measures and monitoring are necessary.

- Guadalupe River Park. The Guadalupe River Park Project, sponsored by the City of San Jose Redevelopment Agency, is adjacent to the Corps' Downtown Guadalupe flood control project, at the top of bank and beyond and includes the River Walk Project and the Confluence Point and West Project. The River Walk Project between Woz Way and Park Avenue consists of a river walk system along the top of banks. The Confluence Point and West Project is at the confluence of Los Gatos Creek with Guadalupe River. This project includes riverbank gabions and a pedestrian bridge over Los Gatos Creek (Talbot 1993).

  In addition to the impacts associated with the Corps flood control project along the same reach of the Guadalupe River (Reach 3), this project will affect 0.8 acre of riparian habitat. The Corps prepared an EA/EIS for the I-280 to I-880 flood control project (dated January 2, 1991) to address additional impacts on riparian corridor vegetation and fish and wildlife habitat resulting from incorporation of trail construction and recreational use from the River Park Project. Mitigation for loss of riparian habitat as a result of adopting the locally preferred flood control plan will consist of 4.7 acres of native riparian habitat plantings.

- The Guadalupe River Park South Corridor Master Plan from I-280 to Coleman Avenue. No riparian habitat removal is expected to result from this project. Potential impacts from trail system development and recreational use will be addressed in an EIR when the park master plan is finalized. These impacts could include disturbances to sensitive wildlife and trampling of existing riparian vegetation and riparian revegetation areas.

- State Route 87 Freeway Upgrade Project from Highway 101 to Julian Street. Freeway widening and bridge construction will affect 4.54 acres of riparian habitat and 1.09 acres of Corps jurisdictional wetlands. No long-term impacts will occur on fishery resources.

  Mitigation for loss of riparian habitat and wetlands requires planting 7.29 acres of riparian habitat adjacent to the east side of the Guadalupe River, and 1.09 acres to mitigate impacts on wetlands. (David Power and Associates 1993, Vincent 1992 and 1993).

- State Route 85 Transportation Corridor Project. The project has directly affected 0.1 acre of riparian vegetation on the Guadalupe River mainstream offstream and indirectly affected 4.5 acres on Los Gatos and Ross Creeks. Mitigation for loss of riparian habitat requires planting 12.1 acres of riparian vegetation on site and 0.2 acre off site (Monette 1992).

  Bridge construction did not adversely affect fisheries, and fish passage was provided to ensure that adverse impacts would not occur on fishery resources in Ross Creek (Monette 1992). Project construction was completed in late 1994.

- San Jose International Airport Expansion Plan. The airport expansion plan would include construction of a new bridge south of Airport Parkway Bridge, and the widening of Airport Boulevard. Potential impacts to riparian vegetation related to bridge construction is mitigated by the mitigation plan proposed for this project and presented in this EIR/EIS. Widening of Airport Boulevard would not have adverse biotic resource impacts.

A seventh project, the City of San Jose Riparian Corridor Policy Study, could affect the Guadalupe River watershed. This study provides policy and development guidelines for riparian areas along all creeks in the City, including defining the riparian corridor and development guidelines for setbacks, access control, landscaping and lighting, and compatible land uses. The City is reviewing the study and may propose its adoption in the future. Adoption and implementation of riparian corridor development guidelines could help to reduce the severity of cumulative impacts in the Guadalupe River watershed.

These projects have the potential to combine with the District flood control project to produce cumulative effects on resources in the project area. Potential cumulative impacts are discussed below, by resource area, with particular emphasis on cumulative effects on riparian systems in the project area.

5.2 CUMULATIVE IMPACTS AND MITIGATION MEASURES

Geology, Soils, and Seismicity

During the construction period, all of the projects in the area have the potential to contribute to erosion and resultant sedimentation in the River. All projects would be subjected to seismic hazards such as ground shaking. These impacts are all fully mitigable with implementation of construction-period erosion control programs, and with standard seismic safety measures incorporated in design. No significant cumulative impacts are expected.

Hydrology

The District and Downtown Army Corps of Engineer's flood control projects would combine to ensure that the Guadalupe River would be capable of conveying the one-percent flood. This impact is considered beneficial, and would not require mitigation.

Potential changes in recharge rates that could result from other district projects, such as the construction of upstream dams or percolation ponds, or from highway construction or development projects, could affect the amount of available water supply. The magnitude of the cumulative impact to recharge areas would depend on the net affect of the project on recharge rates and the effectiveness of mitigation measures proposed for this project and other projects identified in Section 5.1, above.

As mentioned in Section 4.2 Hydrology, this project would have a net gain of 1.6 acres of recharge plus 5.6 acres of riparian mitigation pond that is available for recharge in Reach 12.

Water Quality

Cumulative construction impacts on water quality can be mitigated with implementation of the Storm Water Pollution Prevention Program discussed in the Water Quality Section. Potential cumulative water quality effects from the IBM and Fairchild groundwater pumping programs are insignificant because the water is highly treated and level of contaminants is therefore small. In addition, remediation activities at these sites are nearing completion and surface water discharge of treated groundwater is near zero.

Hazardous Materials

The proposed project would not directly contribute to cumulative hazardous materials impacts because the project does not include the long-term use, storage, or disposal of significant quantities of hazardous materials. The project could, as discussed in Impact HM-2, affect groundwater conditions and could result in changes to site characterization investigations or remedial activities (groundwater cleanup) at known hazardous waste sites in the vicinity. Other construction activities within the cumulative project area (projects identified in Section 5.1, above) could have other adverse or beneficial impacts on groundwater flow directions and potential impacts to surface and groundwater quality.

Land Use and General Plan Considerations

Construction of all of the projects in the area would contribute to short-term land use impacts such as the dust and noise associated with construction. After construction, the character of the project area would be changed by the presence of new facilities such as roadways. Initially, the flood control project would contribute to the overall change in the character of the area due to the presence of major public works projects. However, over time, revegetation of the riparian corridor would mitigate the loss of vegetation (see Visual Resources section).

Highway projects in the vicinity of the Guadalupe River also entail right-of-way acquisition requiring relocation of residents (408 units displaced by the Route 85 project according to Caltrans 1987; 41 units removed by Route 87 according to Caltrans 1991). Thirty-eight of the structures which will be displaced by the Route 87 widening are already owned by Caltrans, and some are not currently rented. This project would also displace two duplexes and one single family dwelling on North San Pedro Street. The project will also relocate a women's minimal security facility (David Powers and Associates 1993). The COE flood control project between I-880 and I-280 would displace 24 units (COE 1985). Three approved City-sponsored projects in San Jose would displace a total of nine residences. Five would be removed by the San Pedro Street project; two would be displaced by the Parole Office project; and two by the Sierra Road extension (Zia 1994). The Relocation Report prepared by the District indicates that adequate replacement housing stock is available. District policy is designed to permit displacement only after replacement housing is located. Therefore, no long-term significant cumulative impacts would result from the project.

Socioeconomics

Cumulatively, the projects proposed in the area would generate a significant number of construction-related jobs. This is a positive impact on the local economy. Residential displacement is discussed in the Land Use and General Plan Considerations section, above.

Traffic

Cumulative traffic impacts in the project area are primarily related to completion of State Route 87. These impacts, and impacts of Route 85 completion would be positive, and would reduce the effect of short-term construction impacts of the District flood control project.

Noise

Other projects in the study region were reviewed to determine if they would increase future noise levels. Included in the review were San Jose International Airport, the Guadalupe Corridor Transportation Facility and roadway traffic in general.

San Jose International Airport has prepared an airport environs plan for the year 2000 which includes noise contours for airport operations (see the Noise section of this EIR/EIS). Noise from aircraft operations is expected to produce approximately 1 dBA increase in the future.

The Guadalupe Corridor Transportation Facility (GCTF) will affect noise environments in Reaches 6, 7, and 8. The EIS for that project (UMTA 1988) includes analyses of operational noise impacts from State Route 87 and light rail transit operations. Results of these analyses indicate that existing noise levels with the project will be increased by 2 to 7 dBA after mitigation. It is expected that increases will be less than 2 dBA at most locations affected by the proposed flood control project. The most significant future noise increase from GCTF will occur at the residences on Mills Court and the end of Atlanta Avenue in Reach 7. For these cases, it is expected that the existing noise level will be increased from 58 to 63 dBA, L_{eq} in future years.

Other major roadways in the study region will experience a significant increase in traffic volumes due to regional growth. Noise increase from regional growth is expected to be 2 dBA or less near major arterials and 2 to 4 dBA in areas remote from major arterials in the next 20 years.

Because the proposed project is not expected to have significant operational noise, cumulative impacts would occur only during the construction phase of the project. Therefore, assessments of construction noise impacts in Chapter 4 include existing background noise which is expected to remain substantially the same for the next five years, and no further mitigation measures are necessary.

Air Quality

Because the flood control project would have no operational air quality impacts, the only potential cumulative effect is associated with short-term construction air quality impacts.

Standard construction-period mitigation measures would prevent significant cumulative emissions of dust and equipment exhaust.

Public Services and Utilities

No cumulative impacts on public services and utilities are expected.

Public Safety

The flood control project is designed to protect public safety. Public safety would be protected by appropriate construction and operational safety measures, including limitation of public access to the channel. Access provided by the Guadalupe River South Corridor Master Plan may, however, pose concerns associated with increased access to the river corridor. The City should evaluate the trail and park system with respect to any additional safety concerns it may create.

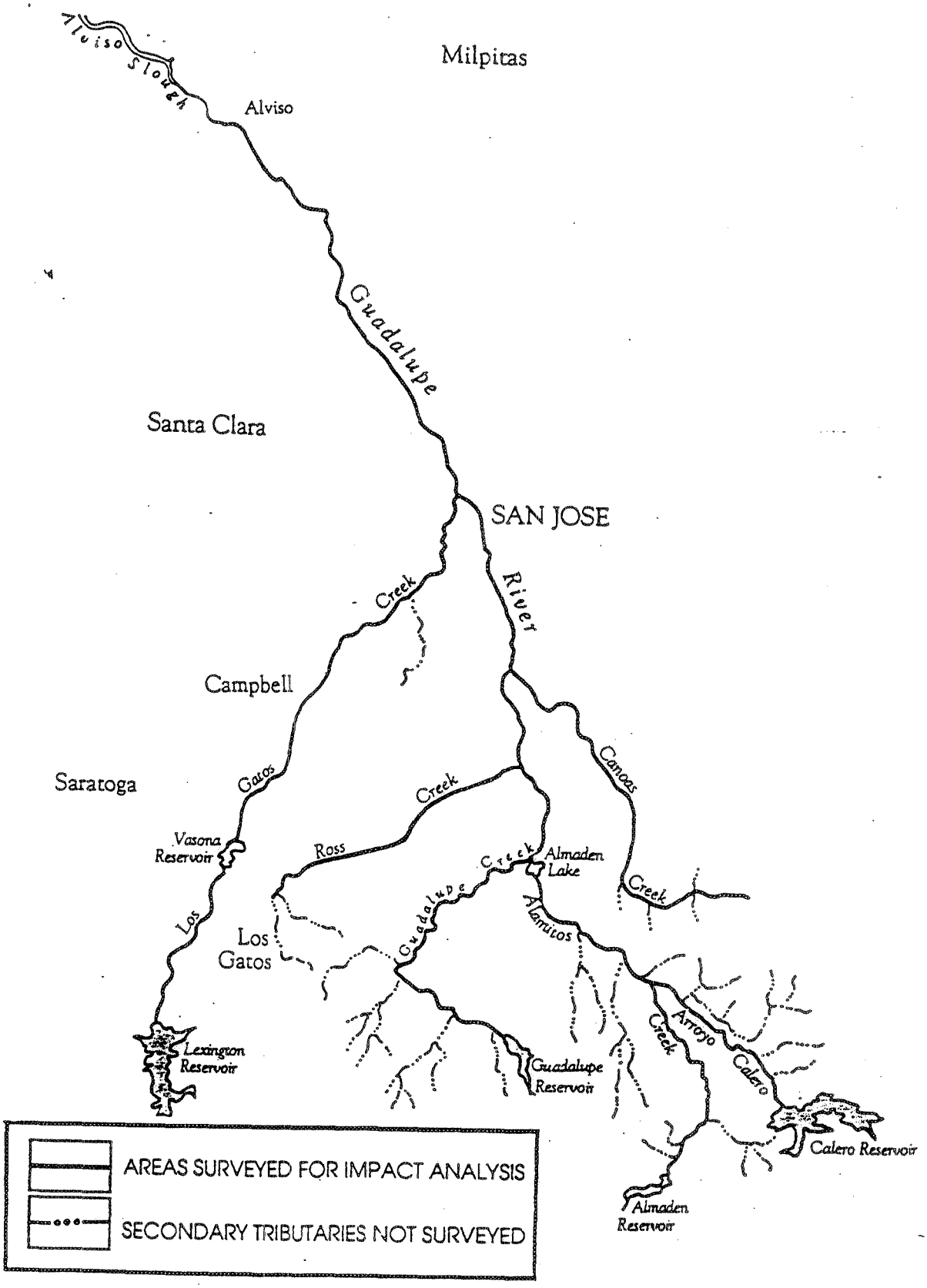
Vegetation

The following cumulative impact analysis is based on a reconnaissance-level field inventory of riparian habitats throughout the Guadalupe River system by The Habitat Restoration Group in 1990 and a review of existing documents describing proposed and approved projects. Appendix C-A contains a detailed description of the methods used by The Habitat Restoration Group to estimate the acreage of existing riparian habitat within the system.

For the purposes of this assessment, the Guadalupe River system encompasses the Guadalupe River mainstream from the mouth at Alviso Slough in South San Francisco Bay to its confluence with Alamitos Creek, and major tributaries of the Guadalupe River: Los Gatos Creek, Canoas Creek, Ross Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero Creek. The study areas for Los Gatos Creek, Guadalupe Creek, Alamitos Creek, and Arroyo Calero Creek extend upstream to their reservoirs (Figure 5.1 and Table 5.2).

No previous studies have analyzed the cumulative impacts of this and other planned projects relative to the historical extent and distribution of riparian habitat along the Guadalupe River system. Substantial portions of the system have been highly disturbed. Table 5.3 lists previously constructed water management projects that may have reduced the extent of riparian habitat along the Guadalupe River and its tributaries. Because many small urban, residential, and agricultural development projects have occurred within the Guadalupe River system, only major projects are included in Table 5.3.

Historical changes in the Santa Clara Valley (in agriculture, urban development, and water development) have resulted in substantial loss of riparian habitat within the Guadalupe River system. Much of the remaining habitat has been degraded by fragmentation, disturbance, reduced flooding, and introduction of non-native species.



Guadalupe River
Cumulative Impact
Study Area

TABLE 5.2

STREAM SEGMENTS INCLUDED IN THE CUMULATIVE IMPACT ASSESSMENT FOR BIOTIC RESOURCES

Stream	Segment	Total Stream Miles*
Guadalupe River	Alviso Slough (SPRR) to confluence with Alamitos Creek	18.8
Los Gatos Creek	Confluence with Guadalupe River to Lexington Reservoir	11.0
Canoas Creek	Confluence with Guadalupe River to Cottle Avenue	7.6
Ross Creek	Confluence with Guadalupe River to Kennedy Road	5.6
Guadalupe Creek	Confluence with Guadalupe River to Guadalupe Reservoir	5.5
Alamitos Creek	Confluence with Guadalupe River to Arroyo Calero to Almaden Reservoir	7.2
Arroyo Calero	Confluence with Alamitos Creek to Arroyo Calero Reservoir	4.0
Total		59.7

* Bank miles = stream miles X 2.

Source: The Habitat Restoration Group 1991 (unpublished data).

TABLE 5.3

HISTORICAL PROJECTS THAT HAVE AFFECTED THE NATURE, EXTENT, AND DISTRIBUTION OF RIPARIAN HABITAT IN THE GUADALUPE RIVER SYSTEM

Affected Reach	Project Description	Construction Date
Guadalupe River		
Willow Glen Way to Willow Street	Lewis Canal	1866
Alviso Slough County Marina and SPRR to Highway 101	District channelization/levee improvements	1963-1965, 1985
Highway 101 to I-880	District channel excavation, levees adjacent to San Jose Airport	late 1960s
Branham Lane to Blossom Hill Road	Gravel quarry operation	before 1970s
Coleman Avenue to Blossom Hill Road	District percolation ponds: Los Capitancillos and Almaden	1970
Blossom Hill Road to Almaden Expressway and Coleman Avenue	District flood control project, gabion slope protection, replace drop structure, in-channel percolation ponds	1970, 1976
Ironwood Drive to Foxworthy Avenue, Almaden Expressway to 6,600 feet upstream	Santa Clara County Transportation Agency widening of Almaden Expressway, gabion slope protection, rock lining	1972/1973
From 4,150 feet to 8,240 feet upstream of Highway 237	Westerly bank levee	1974
Los Gatos Creek		
Downstream of Vasona Reservoir	Construction of Vasona Reservoir	1935
Downstream of Lexington Reservoir	Construction of Lexington Reservoir	1952
Lexington Reservoir to Saratoga Avenue	Concrete channelization and levee slopes associated with construction of Highway 17	1966-1969

TABLE 5.3 (continued)

Affected Reach	Project Description	Construction Date
Ross Creek		
Confluence with Guadalupe River to Kirk Road	Channelization	1955
Camino del Cerro to Kirk Road	Channelization	1955
Canoas Creek		
Almaden Road to Canoas Creek (existing)	Channelization	1970
Nightingale Drive to Cottle Road	Channelization	1967
Almaden Expressway to Nightingale Drive	Channelization	1976
Guadalupe Creek		
Downstream of Guadalupe Reservoir	Construction of Guadalupe Reservoir	1935
Confluence with Guadalupe River to Camden Avenue	District flood control modified floodplain	1982
Alamitos Creek		
Downstream of Almaden Reservoir	Construction of Almaden Reservoir	1935
Camden Avenue to McKean Road	Grading, berms (private developer)	1975
Camden Avenue to Almaden Lake Park	District channelization	1980
Arroyo Calero Creek		
Downstream of Calero Reservoir	Construction of Calero Reservoir	1935

Source: Santa Clara Valley Water District.

Currently, riparian habitat occurs along 60.9 bank miles of the Guadalupe River system (51.0 percent of the system total of 119.3 bank miles). Approximately 16.5 bank miles of riparian habitat occurs along the Guadalupe River (44.0 percent of the Guadalupe River; total of 37.5 bank miles). Approximately 4.0 bank miles (3.3 percent of the system total) have been modified through the installation of gabions, concrete lining, rip-rap, and underground culverts. The remaining areas have been converted to ruderal vegetation, upland landscaping, and bare areas. Existing amounts of major habitats in the Guadalupe River system are summarized in Table 5.4.

Impact Cv-1: Direct Removal of Riparian Vegetation and Near-Term Reduction in Mature Riparian Vegetation. Implementing several projects that are close together or overlap in time and space amplifies the effects of riparian vegetation removal. Although the direct impacts of each project would be mitigated by planting, maintaining, and monitoring replacement vegetation, the combined impact on riparian habitat condition would be greater than the sum of the incremental effects because the interim loss of shade, habitat, and self-sustaining vegetation would affect wildlife more than if the projects were widely separated in time and space.

Table 5.1 summarizes the approximate incremental and cumulative acres of riparian habitat loss from these projects. The majority of the impact would be on cottonwood/willow forest, which possesses high botanical and wildlife values.

This is considered a significant cumulative impact, because historically the amount, condition, and continuity of riparian habitat in the Santa Clara Valley, especially along the Guadalupe River, has been substantially reduced, thereby increasing the regional importance of remaining riparian habitats to fish and wildlife. The District will minimize its contribution to this impact by implementing the following mitigation measures.

The District currently participates in watershed management planning for the Guadalupe River watershed in coordination with other responsible agencies. This effort will help guide the long-term management of biotic and other resources within the Guadalupe River system.

Mitigation Measure Cv-1a: Minimize Recreational Impacts on Riparian Vegetation. To minimize indirect impacts on remaining riparian vegetation and revegetation areas, the District would incorporate the following measures into the project.

- The permanent maintenance road would not be sited in the revegetation areas in Reach 12 to avoid disturbance of mitigation plantings.
- The perimeters of riparian mitigation revegetation sites accessible to recreational users would be fenced and posted with "Mitigation Area, Please Do Not Disturb" signs until the vegetation has become well established (an estimated 5-8 years).
- Where possible, dense vegetative screening would be planted between trails or maintenance roads and revegetation sites.
- The District would continue to be fully involved in the planning of the trail system for the Guadalupe River Corridor South Park so as to protect the mitigation sites and natural areas.

TABLE 5.4

SUMMARY OF EXISTING HABITATS IN THE GUADALUPE RIVER SYSTEM

Habitat	Mainstem		Tributaries		System	
	Acres	% of Total	Acres	% of Total	Acres	% of Total
Riparian						
Sycamore		0%	240.1	61%	240.1	41%
Cottonwood/Willow	95.8	49%	9.9	3%	105.7	18%
Foothill		0%	52.3	13%	52.3	9%
Mixed		0%	5.8	1%	5.8	1%
Willow		0%	3.0	1%	3.0	1%
Revegetation	1.1	1%		0%	1.1	<1%
Subtotal	96.9	50%	311.1	80%	408.0	70%
Nonriparian						
Upland Landscaping	5.5	3%	6.2	2%	11.7	2%
Ruderal (Scrub & Herbaceous)	91.6	47%	73.2	19%	164.8	28%
Bare	1.6	1%	0.3	<1%	1.9	<1%
Subtotal	98.7	50%	79.7	20%	178.4	30%
Total	**195.6**	**100%**	**390.8**	**100%**	**586.4**	**100%**

Source: The Habitat Restoration Group 1991 (unpublished data).

Mitigation Measure Cv-1b: Implement Revegetation during the First Fall Planting Season after Reach Construction. To minimize the delay between project impacts on riparian habitat and the attainment of full compensation in revegetation areas, the District would revegetate during the first fall planting season after completing construction in each reach.

In addition, the District's construction schedule is to begin improvements in Reaches 6, 7, and 12 early in the project phasing. Because Reaches 6, 7, and 12 contain much of the mitigation vegetation, completing construction in these reaches would allow for the earliest possible establishment of mitigation vegetation and for providing compensation for temporary loss of habitat.

Wildlife

Implementation of several projects would result in substantial long-term increases in human activity within the Guadalupe River riparian corridor. In addition, the District has a policy

governing joint public use of District facilities (SCVWD, Resolution No. 74-38) that would allow future park projects to utilize floodway maintenance roads for trails. After completion of construction, increased human activities would include revegetation monitoring, floodway maintenance work, and recreational uses. These activities could increase disturbance of wildlife over current levels, especially during the breeding season.

This cumulative impact would be greater than the sum of the impacts of each project separately, because the impacts would be close together or overlapping in time and space, reducing the potential for wildlife to tolerate or avoid the disturbance.

This impact is considered less than significant because wildlife in the affected areas are already subjected to substantial disturbance from urban activities outside the project areas, and urban and recreational disturbances would increase even in the absence of the major projects listed above. No mitigation is required; however, the District would minimize its contribution to wildlife disturbance by implementing mitigation measures recommended to reduce impacts to vegetation.

Fisheries

The preferred project and other major projects would modify the stream channel and riparian corridor of the Guadalupe River, removing streamside vegetation that shades the stream channel and provides fish escape cover. These major channel modifications could be initiated within a few years of each other and span a significant portion of the channel of the Guadalupe River. However, construction of much of the preferred project could occur 10-20 years after the other major projects.

Implementation of the Downtown Guadalupe project was determined to affect approximately 9,800 linear feet of shaded riverine aquatic (SRA) habitat; however, impacts on SRA are being reevaluated. Implementing the proposed upper Guadalupe project would result in the direct removal of 3,959 linear feet of overhead cover in the form of overwater riparian vegetation and 359 linear feet of undercut banks.

Loss of SRA habitat from implementing the Downtown Guadalupe project will be fully mitigated. Impacts on SRA habitat from the preferred project would be fully mitigated. Mitigation measures required for the SRA impacts of the preferred project are discussed under "Fisheries." Mitigation for removal of riparian habitat due to the preferred project is also discussed under "Vegetation." Required mitigation to compensate for removal of riparian forest and SRA habitat includes preparing and implementing an integrated vegetation mitigation plan. In addition, the District's implementation of Mitigation Measure F-1 and Mitigation Measure Cf-1 (see below) would provide fish access to an additional total of 13.3 miles of stream habitat. The separated timing of the projects and the District's participation in watershed management planning will also help to minimize cumulative impacts on the riparian corridor of the Guadalupe River.

The cumulative impact of removing streamside vegetation is therefore considered less than significant, and no mitigation is required.

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Fisheries

The preferred project and other major projects would modify the stream channel and riparian corridor of the Guadalupe River, removing streamside vegetation that shades the stream channel and provides fish escape cover. These major channel modifications could be initiated within a few years of each other and span a significant portion of the channel of the Guadalupe River. However, construction of much of the preferred project could occur 10-20 years after the other major projects.

Implementation of the Downtown Guadalupe project was determined to affect approximately 9,800 linear feet of shaded riverine aquatic (SRA) habitat; however, impacts on SRA are being reevaluated. Implementing the proposed upper Guadalupe project would result in the direct removal of 5,096 linear feet of overhead cover in the form of overwater riparian vegetation and 1,720 linear feet of undercut banks.

Loss of SRA habitat from implementing the Downtown Guadalupe project will be fully mitigated. Impacts on SRA habitat from the preferred project would be fully mitigated. Mitigation measures required for the SRA impacts of the preferred project are discussed under "Fisheries." Mitigation for removal of riparian habitat due to the preferred project is also discussed under "Vegetation." Required mitigation to compensate for removal of riparian forest and SRA habitat includes preparing and implementing an integrated vegetation mitigation plan. In addition, the District's implementation of Mitigation Measure F-1 and Mitigation Measure Cf-1 (see below) would provide fish access to an additional total of 13.3 miles of stream habitat. The separated timing of the projects and the District's participation in watershed management planning will also help to minimize cumulative impacts on the riparian corridor of the Guadalupe River.

The cumulative impact of removing streamside vegetation is therefore considered less than significant, and no mitigation is required.

Impact Cf-1: Blocked Access to Optimum Fishery Habitat Upstream. Construction impacts of the proposed project are increased by the continued effects of previous projects. An impassable drop structure upstream of Blossom Hill, constructed as part of a District flood control project in 1977, blocks access by steelhead and salmon to spawning and rearing habitat in Alamitos, Arroyo Calero, and Guadalupe creeks. Two downstream barriers at Hillsdale Avenue and Branham Lane have restricted the migration of steelhead and salmon upstream to the drop structure except when flows exceed approximately 100 cfs.

As part of the proposed project, the District would remove barriers at Hillsdale Avenue and Branham Lane and further modify the weir at stream gage Station No. 23B to improve fish passage conditions. In accordance with a September, 1995 settlement agreement, the District has committed to construction of a step pool fish ladder at the Blossom Hill drop structure that will be fully operational by October 15, 1999 (refer to "Settlement Agreement" in Chapter 3, "Preferred Project and Alternatives"). Construction of the fish ladder would provide access to an additional 2.9 miles of fish habitat from the drop structure to potential fish barriers at Mason Dam on Guadalupe Creek and the gabion structure on Alamitos Creek upstream of Mazzone Drive (Table 5.5).

Even with these mitigation measures, construction of the proposed project and other projects on the Guadalupe River, addressed earlier in this chapter, would result in cumulative impacts on anadromous fish habitat, water temperatures, and potential sedimentation of spawning and food producing areas. These cumulative impacts are considered significant.

Mitigation Measure Cf-1: Provide for Fish Passage on Alamitos Creek and Monitor for the Presence of Native Fish. To mitigate the cumulative impacts on fisheries habitat, the District proposes to implement Mitigation Measure Cf-1. The mitigation measure includes providing fish passage at the gabion structure on Alamitos Creek upstream of Mazzone Drive. Fish passage devices would be designed in consultation with DFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained. Construction of the fish passage device would provide access to approximately 10.7 miles of upstream fish habitat (Table 5.5), which is more than the total length of the Guadalupe River included in the project areas for the Upper Guadalupe River Flood Control Project (approximately 6.4 miles) and the Downtown Guadalupe River Flood Control Project (approximately 2.6 miles).

Successful implementation of Mitigation Measure Cf-1, in conjunction with implementing Mitigation Measure F-1, would allow anadromous species (such as chinook salmon and steelhead trout) access to more suitable spawning habitat in the upstream tributaries. Mitigation Measure F-1 includes improving fish passage conditions at Mason Dam, Stream Gage Station No. 43, and the concrete channel on Guadalupe Creek, and would provide access to 2.6 miles of higher quality fish habitat upstream of the project.

Implementing Mitigation Measures F-1 and Cf-1 would allow access to approximately 13.3 miles of more suitable upstream spawning and rearing habitat, which would result in a significant, long-term beneficial impact on fishery resources. With the step pool ladder at the Blossom Hill drop structure and modifications to the partial barriers in the Upper Guadalupe River, a total of approximately 19 miles of more suitable habitat would be available.

TABLE 5.5

SUMMARY OF FISH HABITAT ACCESSIBLE BY REMOVAL OF FISH BARRIERS ON THE GUADALUPE RIVER AND ALAMITOS, CALERO, AND GUADALUPE CREEKS

Fish Barrier to be Removed	Location	Access to Habitat			Creek Benefited	Fish Passage Limit
		Feet	Miles	Cumulative Miles		
Stream gage Station No. 23B (1)	Guadalupe River	2,100	0.40	0.40	Guadalupe River	Hillsdale Avenue weir
Hillsdale Avenue weir (2)	Guadalupe River	3,550	0.67	1.07	Guadalupe River	Vehicle crossing downstream of Ross Creek
Vehicle crossing downstream of Ross Creek (3)	Guadalupe River	8,600	1.63	2.70	Guadalupe River	Blossom Hill drop structure
Blossom Hill drop structure (4)	Guadalupe River	1,650	0.31	3.01	Guadalupe River	Guadalupe River/Alamitos Creek and Guadalupe River/ Guadalupe Creek confluences
Blossom Hill drop structure (4)	Guadalupe River	9,650	1.83	4.84	Guadalupe Creek[a]	Mason Dam
Mason Dam (5)	Guadalupe Creek	6,850	1.30	6.14	Guadalupe Creek	Stream gage Station No. 43
Stream gage Station No. 43 (6)	Guadalupe Creek	3,300	0.63	6.76	Guadalupe Creek	Concrete channel

TABLE 5.5 (continued)

Fish Barrier to be Removed	Location	Access to Habitat			Creek Benefited	Fish Passage Limit
		Feet	Miles	Cumulative Miles		
Concrete channel (7)	Guadalupe Creek	3,750	0.71	7.47	Guadalupe Creek	Guadalupe Reservoir
Blossom Hill drop structure (4)	Guadalupe River	4,200	0.80	8.27	Alamitos Creek[b]	Gabion structure upstream of Mazzone Drive
Gabion structure upstream of Mazzone Drive (8)	Alamitos Creek	34,900	6.61	14.88	Alamitos Creek	Stream gage Station No. 16
Stream gage Station No. 16	Alamitos Creek	1,350	0.26	15.13	Alamitos Creek	Almaden Reservoir [not proposed to be removed]
Gabion structure upstream of Mazzone Drive (8)	Alamitos Creek	21,500	4.07	19.20	Calero Creek[c]	Arroyo Calero Reservoir

Notes:

Length is based on stations in Santa Clara Valley Water District's Maps of Flood Control Facilities and Limits of 1% Flooding (June 1993 edition).

A total of eight fish barriers would be removed, resulting in approximately 19 cumulative miles of recovered access to fish habitat.

a Fish passage benefit begins at Guadalupe River/Guadalupe Creek confluence.

b Fish passage benefit begins at Guadalupe River/Alamitos Creek confluence.

c Fish passage benefit begins at Alamitos Creek/Arroyo Calero Creek confluence.

The District would implement a two-phase monitoring program of the fish passage improvements at Alamitos Creek to determine the success of the improvements: annual surveys (phase one) to determine whether fish are using the structures, and ongoing surveys in perpetuity (phase two) to ensure that structures are operating as designed. The District would develop an appropriate monitoring program in coordination with DFG and USFWS to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout) at the gabion structure on Alamitos Creek. Phase one of the monitoring program would commence in the fall following completion of fish passage improvements. Monitoring would be conducted from October 1 to April 30, when migrating adult chinook salmon and steelhead trout are expected to occur.

Potential monitoring activities could consist of visual surveys at the improvement location; carcass, redd, and juvenile surveys in reaches upstream of the improvement location; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol would be developed in consultation with DFG and USFWS, and would depend on the opportunities and constraints governed by the local conditions (e.g., high turbidity levels during storm runoff periods may preclude the use of visual observations as a sampling method).

In addition to visual observations to determine successful fish passage, the District would look for indicators of passage problems, such as fish congregating downstream of the ladder or failed attempts by fish to negotiate the ladder.

The District would submit an annual monitoring report to DFG for up to five years after modification of the gabion structure on Alamitos Creek. If the objective of attaining fish passage has not been met and is not due to factors beyond the District's control (e.g., drought, natural downstream barriers, or limited numbers of fish), remedial actions would be initiated and monitoring would continue for up to an additional 5 years. Remedial actions could include redesign of structural improvements or further negotiations with DFG and USFWS regarding other appropriate mitigation.

Mitigation Measure Cf-1 would be considered successful when fish passage was documented and no indicators of passage problems were present. After successful fish passage was documented, phase one of the monitoring program would be considered complete.

Phase two of the monitoring plan would include surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishway is free of obstructions and debris that would preclude their normal operation. The District would follow the same maintenance and inspection procedures as outlined in an existing MOU with DFG, and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current MOU requires the District to inspect all fish ladders once every work day and at least once per day during high flow events on nonworking days during the migration period. This phase of the monitoring program would continued for the life of the improvement structure.

Mitigation Measure Cf-1 would provide fish access to an additional 10.7 miles of stream habitat. Successful implementation of Mitigation Measure Cf-1, in conjunction with implementing Mitigation Measure F-1, would provide chinook salmon and steelhead trout access to a combined total of 13.3 miles of additional spawning and rearing habitat. Together, these measures will result in a long-term benefit to the anadromous fishery of the Guadalupe River because of the increase in habitat availability and the anticipated benefits associated with the improved habitat conditions found in these tributary streams. With the step pool ladder at the Blossom Hill drop structure and modifications to the partial barriers in the Upper Guadalupe River, a total of approximately 19 miles of more suitable habitat would be available.

Visual/Aesthetic Resources

During construction, the flood control project would contribute to a temporary change in the visual character of the project area. Successful implementation of revegetation and other mitigation measures discussed under "Visual/Aesthetics" would restore the aesthetic character of the riparian corridor. No cumulative impacts on visual/aesthetic resources are expected.

Historic and Archaeological Resources

The Preferred Project could affect cultural resources along the Guadalupe River and could contribute to cumulative impacts to archaeological and historical resources found within the Santa Clara Valley. Although direct impact to archaeological sites would be mitigated to a less-than-significant level, the impact would contribute to a general loss of the existing primary data base. This primary data base in the Santa Clara Valley overall includes intact prehistoric and historic resources such as midden deposits, Native American Burials, historic structures, and historic archaeological deposits. Cultural resources located along the Guadalupe river are important to understanding the development of the area since the river had been an important factor in shaping the prehistoric and historic development of the area.

Urbanization has had an adverse effect on the various cultural resources located along the Guadalupe River. Prehistoric cultural resources such as habitation sites, food processing areas, and Native American cemeteries have been affected by construction projects such as housing developments, roadwork, and utility installation. In addition, historic properties have been affected by modernization, demolitions, and general effects of urbanization. In particular, Spanish and Mexican period cultural resources and late nineteenth century and early twentieth century housing areas or structures have been altered, removed, or lost.

To offset this potential of cultural resources loss, project-specific and CEQA-required mitigation would contribute to our general knowledge of the prehistory and history of the Santa Clara Valley. Although a portion of the primary data base would be lost, additional information would be gathered through data collection programs and analysis of cultural materials. This information contributes to our understanding of the development of the valley from prehistoric times to the present and expands our understanding of the area. The mitigation programs for prehistoric resources in particular have increased our knowledge of

Native American activities in the area of the Guadalupe River at least ten fold since the late 1970s when CEQA required archaeological studies in connection with development.

5.3 CUMULATIVE IMPACTS OF PROJECT ALTERNATIVES

Minimize Vegetation Impacts Alternative

Potential cumulative impacts of the Minimized Vegetation Impact Alternative would be similar to those of the preferred project for most types of impacts. The comparative analysis of the Preferred Project, the Minimized Vegetation Impact Alternative, and the No Project alternative contained in each topic section would apply to the project's incremental contribution to cumulative impacts. Significant cumulative vegetation and fisheries impacts were identified for the Preferred Project. These impacts would also occur under the Minimize Vegetation Impact Alternative.

Cumulative vegetation impacts under the Minimize Vegetation Impacts Alternative would be less than those for the Preferred Project because less instream vegetation removal would be required in Reaches 9, 10A, and 11A. The Minimize Vegetation Impacts Alternative would contribute to the short-term cumulative reduction of mature riparian vegetation (removing about 5 acres of riparian habitat), about 4.3 acres less than the Preferred Project. No long-term cumulative vegetation impacts would result from the Minimize Vegetation Impacts Alternative.

The projects contribution to cumulative fishery impacts under the Minimize Vegetation Impacts Alternative would be somewhat less than those described for the Preferred Project. Reduced fishery impacts would result from reduced instream construction activities.

No Project Alternative

The No Project Alternative would not result in cumulative impacts to the Guadalupe River corridor. Implementation of the No Project Alternative would not address existing flooding problems or potential future cumulative flooding problems in the project area.

CHAPTER 6

GROWTH INDUCING IMPACTS

CHAPTER 6

GROWTH INDUCING IMPACTS

The areas of the City of San Jose adjacent to the Guadalupe River are largely developed; little vacant land remains. Growth in the project area is not presently impeded to any great extent by flood risk. Therefore, implementation of the flood control project would not remove a significant restraint to growth. However, the project would reduce the cost of any future development in the floodplain, because removal of flood hazards would reduce design and insurance requirements for future development. Implementation of the flood control project would not ultimately increase the total level of development in the project area, but might slightly accelerate the rate at which some marginal areas within the floodplain would be developed.

Previous studies by the U.S. Army Corps of Engineers (1985) estimate that twenty years after implementation of a flood control project in the 1,500-acre project area, five percent more development would occur in areas that were formerly within the 100-year floodplain, compared to projected development without a flood control project. However, forty years after project implementation, the level of development would be similar with or without the project.

The proposed flood control project would not have substantial growth-inducing impacts. Growth within the project area would be controlled by the City of San Jose General Plan. While the project might slightly accelerate the rate of development of some marginal areas within the existing floodplain, the total level of development would remain the same. No mitigation measures for growth-related impacts are necessary.

CHAPTER 7

IMPACT OVERVIEW

CHAPTER 7

IMPACT OVERVIEW

7.1 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The project would cause short-term construction impacts, described in Chapter 4, but would result in long-term reduction in the flood risk to homes and businesses in San Jose near the Upper Guadalupe River, Canoas Creek, and Ross Creek. Reduced flood hazards would enhance land uses in the vicinity of the project area, by eliminating requirements for insurance and flood protection, and decreasing potential costs of flood-related damage.

While the project would result in immediate and long-term benefits to local land uses, there would be a substantial impact on riparian habitat within the project area. These impacts would be mitigated by implementation of habitat replacement and enhancement measures, but the maintenance of long-term productivity[1] would depend on the success of this mitigation program. If mitigation measures recommended to reduce vegetation impacts of the project were successfully implemented, the long-term productivity of the riparian vegetation would eventually be restored.

7.2 IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

A portion of the project area which now supports residential and commercial uses would be committed to flood control purposes. This commitment of land for flood control would essentially be irreversible, and would commit future generations to similar uses. The project would not result in a large commitment of nonrenewable resources. Nor would the project include highway construction or other improvements what would provide access to a previously inaccessible area.

7.3 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

There are no significant unavoidable adverse impacts in the areas of geology, soils, and seismicity; water quality; hydrology; hazardous materials; land use; socioeconomics; traffic; noise; air quality; public services; public safety; or historic and archaeological resources.

[1] Long-term productivity is used here in the context of CEQA Section 15126(f). Productivity does not have a precise biological meaning, but rather refers to the overall state of the environment.

Although the project would create considerable disruption during construction, these impacts are short-term and can be mitigated by use of appropriate measures.

The flood control project would result in significant short-term riparian habitat loss. With implementation of mitigation measures recommended in Section 4.12 (Vegetation) of this EIR/EIS, this impact would eventually be eliminated as new riparian vegetation matures and replaces the vegetation that would be removed as part of the project. Implementation of mitigation measures recommended in Section 4.13 and 4.14, Wildlife and Fisheries, should restore fish wildlife and habitat and no unavoidable adverse impacts are expected to result from the project.

7.4 EFFECTS FOUND NOT TO BE SIGNIFICANT

Energy use associated with the project was determined not to be a significant impact. The project would require energy for construction, but the energy would not be used in a wasteful manner, and energy consumption for construction would not constitute a substantial increase in demand upon existing energy sources. Impacts in other areas are discussed in detail in Chapter 4 of this EIR/EIS.

CHAPTER 8

MITIGATION MONITORING PLAN

CHAPTER 8

MITIGATION MONITORING PLAN

Pursuant to the California Public Resources Code 21081.6, the following mitigation monitoring plan is adopted for those conditions of approval identified in this EIR/EIS for the Guadalupe Flood Control Project as being necessary to reduce significant environmental effects.

The procedure for ensuring implementation of most mitigation measures is generally two-fold. The first step is to assure that measures are incorporated in plans and specifications for the project. All plans would need to be approved and accepted by the Santa Clara Valley Water District (District). During the construction period, the District would employ a construction manager to monitor the contractor and the progress of construction. The construction manager would be at the construction site during the entire construction period and would ensure that measures incorporated in the plans are implemented in the construction process. Monitoring that would occur after construction is specifically identified in the attached mitigation monitoring plan.

The Mitigation Monitoring Plan is presented in a table format (Table 8.1) and contains a list of mitigation measures organized by topic. The mitigation measures listed are identified with letter-number symbols that correspond to the impact and mitigation measure designations used throughout Chapter 4. For example, the first impact/mitigation measure identified in Chapter 4, Section 4.1 (Geology, Seismicity and Soils) is G-1. The mitigation measure is listed in Table 8.1: G-1 Manage Excavated Soils to Minimize Erosion. Table 8.1 also identifies the recommended monitoring action, responsible party, and schedule for implementation of monitoring action.

TABLE 8.1

MITIGATION MONITORING PLAN

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
GEOLOGY, SEISMICITY AND SOILS				
G-1.	**Install Sufficient Support and Bracing During Shoring.** A shoring system would be designed and installed to specifically control ground movement. This could include the installation of an adequately stiff wall and sufficient bracing. Monitoring of ground movement would also occur throughout the construction period in sensitive areas.	Sign-off that plans and specifications incorporate support and bracing mitigation measures; site inspection to verify that construction contractor complies with specifications; monitoring of ground movement in sensitive areas throughout the construction period and additional bracing, if necessary, to control ground movement.	District	Sign-off one time only; regular inspection by construction manager during construction; if necessary, additional bracing in sensitive areas during construction.
G-2.	**Use a Backhoe to Drive Piles Where Vibration Could Result in Ground Settlement.** The vibration intensity caused by pile driving depends on the type of pile driving equipment and the soil conditions on the site. At sites where vibrations may cause ground settlement and in locations where it is feasible, a backhoe would be used to drive sheet piles instead of a vibratory pile driver.	Identify areas where vibrations could result in ground settlement; specify the use of non-vibrating equipment to drive piles in these areas in plans and specifications.	District	Areas where vibrations could result in ground settlement would be identified prior to beginning construction; regular inspection by construction manager during construction to ensure use of non-vibrating equipment as specified.
G-3	**Limit Unsupported Slopes to 2:1 and Anchor Gabions/ Cribwalls Unless Determined Otherwise in a Geotechnical Report.** Gabion/cribwall linings have been designed for the project to control erosion and ensure slope stability. Gabions/cribwalls proposed in Reaches 6, 7, 8 and portions of 9 and 10 would be	Sign-off that plans and specifications incorporate measure; site inspection to verify that construction contractor complies with specifications.	District	Sign-off one time only; regular inspection by construction manager during construction.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	securely moored in the sediment substrate to mitigate the effects of seismically-induced slope instability. During construction, all slopes with saturated sands and silts would be shored to prevent slope failure until gabions or retaining walls can be built. All constructed earthen banks would have a 2:1 grade or would approximate the natural preconstruction grade to prevent oversteepening. Construction and design criteria (such as final bank slopes and placement of gabions) would be supervised by a qualified engineer or certified engineering geologist.			
G-4.	**Comply with the Uniform Building Code Seismic Resistance Specifications.** To reduce the potential for earthquake damage, structures, including bridges and culverts, would be designed to conform with the requirements of the Uniform Building Code for Seismic Zone 4, the most stringent requirements.	Sign-off that plans and specifications incorporate design recommendations of a structural engineer specializing in earthquake-resistant design.	District	Sign-off one time only.
WATER QUALITY				
WQ-1.	**Prepare and Implement a Storm Water Pollution Prevention Plan.** Prior to construction activity, a Notice of Intent and annual fee would be submitted to the State Water Resources Control Board for coverage under the NPDES General Construction Activity Storm Water Permit. This Permit requires the preparation and implementation of a Storm Water Pollution Prevention Plan, which must contain source reduction, erosion and sediment control measures, and best management practices designed to reduce the amount of pollutants that may be discharged to the environment via storm water. The District would comply with requirements set forth in the General Permit. Full compliance would reduce potential impacts to an insignificant level. A Storm Water Pollution Prevention Plan would include the following features: • Conducting as much construction as possible during the dry	Verify that plans and specifications incorporate Storm Water Pollution Prevention Plan (alternatively, specifications may require that contractor prepare and submit erosion control plan for approval by District prior to construction); site inspection to verify that construction contractor complies with specifications or with approved plan. After construction is complete and winter rains begin, monitoring of erosion control measures would be conducted by the District. Appendix C outlines the District's proposed maintenance program,	District	Verify one time only; regular inspection by construction manager during construction. Scheduled maintenance as described in the District's Maintenance Program.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
season • Terracing of disturbed slopes, if necessary, to prevent wash-out during severe storms • Installation of detention ponds, if necessary, at the bottom of slopes during construction • Use of sediment catchment barriers, such as straw bales, to control runoff during construction • Use of timed-release fertilizer in areas where disturbed soil with low fertility may hinder re-establishment of vegetation • Immediate re-seeding with native species after construction • Netting or other ground covers to impede soil loss on steep slopes	which specifies sediment removal procedures. If erosion problems are noted, immediate corrective action would be undertaken and the Storm Water Pollution Prevention Plan would be revised, if necessary.		
HAZARDOUS MATERIALS			
HM-1: **Conduct Site Investigations and Remediation and Waste Disposal in Accordance with Applicable Laws and Regulations.** • Conduct Level I and Level II hazardous material investigation to identify and delineate extent of hazardous material contamination with the project limits and evaluate potential impacts to project construction. • Conduct property preacquisition investigation for hazardous materials to ensure the contaminated properties are properly identified and remediated by the property owners prior to acquisition to minimize hazardous material impacts to project construction. • Remove hazardous materials within project limits prior to construction to minimize impacts to project construction.	Verify that plans and specifications include appropriate soil monitoring; site inspection during excavation and dewatering; sign-off on soils sampling plan; sign-off on analytical results; if contaminants are present, sign-off on remediation and disposal plan; site inspection to verify that construction contractor complies with remediation and disposal plan.	District (with RWQCB and California Department of Toxic Substances Control (DTSC) approval if contaminants are found)	Verify one time only; regular inspection during construction and at least daily during excavation of deeper soils to ensure proper evaluation for possible contamination; site inspection during construction to ensure compliance with remediation and disposal plan.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
• Obtain acceptance from a proper disposal facility for soils that contain elevated concentrations of chemical contaminants but are not classified as hazardous waste soil. • Obtain necessary permits to discharge and provide treatment prior to discharge of contaminated groundwater encountered during construction. • Inform the contractor of the presence of potential hazardous materials within project limits so that proper health and safety measures can be provided by the contractor to the construction workers. • Prepare construction specifications for the proper management of hazardous materials encountered during construction.			
HM-2. **Monitor Groundwater Gradients and Migration of Contaminant Plumes at Hazardous Waste Sites in the Vicinity of the Project Site to Determine if Project Construction Has Adversely Affected Site Characterization and/or Remediation Activities.** If it were determined that the project would impact the investigative and/or remedial activities at a site, the District would develop and implement a mitigation plan for each specific site. The mitigation plan would ensure that potential impacts to the investigation and/or cleanup of contaminated sites from the project are properly identified, monitored, and minimized. • Construct groundwater monitor wells between the site and Guadalupe River to monitor and evaluate changes to groundwater conditions as a result of the project construction; • Modify flood control design or develop appropriate control measures to minimize impacts to investigation and cleanup of adjacent contaminated sites; • Develop and implement additional mitigation measures, should the results of monitoring after project construction indicate that	Develop and implement a plan for monitoring groundwater gradients and contaminant plume changes during construction and operation of the project, if necessary. If three years of monitoring indicates no impact, monitoring may be abandoned or reduced in frequency A site-specific mitigation plan may include some or all of the following items, depending on specific site conditions: • Perform periodic review (e.g., quarterly) of reports District submitted to regulatory agencies as part of the Quarterly groundwater investigation or cleanup at the site;	District	Quarterly groundwater level measurements and water quality sampling as necessary for constituents known to occur in the groundwater associated with nearby hazardous waste sites

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
the project is adversely affecting the investigative and/or remedial activities at a site.	• Review depth-to-groundwater information from constituents known to available groundwater monitor wells within the site vicinity; • Perform periodic groundwater level measurements and water quality sampling, as necessary.		
HM-3. **Conduct Asbestos Inspections and Removals.** As specified in the District's Property Management Plan, structures would be inspected for the presences of ACMs prior to demolition. If present, ACMs would be removed by a California OSHA certified and licensed asbestos removal contractor. The ACM waste would be disposed of at a facility legally permitted to accept asbestos waste. Emissions of potential asbestos-containing dust would be controlled during demolition in accordance with Bay Area Air Quality Management District (BAAQMD) Regulation 11, Rule 2.	The District would obtain approval for planned ACM removal from the Bay Area Air Quality Management District and would contract with a licensed asbestos removal contractor.	District (with BAAQMD approval, as necessary)	Prior to and during demolition of ACM-containing structures.
LAND USE			
LU-1. **Implement Air Quality, Noise, Traffic, and Public Safety Measures to Mitigate Short-term Construction Impacts.** To minimize the direct and indirect impacts associated with project construction, mitigation measures proposed for other sections of this chapter pertaining to air quality, noise, traffic, and public safety during the construction period would be implemented for the project and included as part of the construction contract documents.	Refer to Mitigation Measures T-1, T-5, A-1, N-1 PS-1, PS-2 and PS-3 in the Traffic, Air Quality, Noise and Public Safety sections.		
LU-2. **Implement Property Management Plan to Maintain Rental Housing in the Community and Create Attractive Viable Uses for Vacant Properties.** The District has developed a Property Management Plan which contains guidelines for renting, demolition, and interim use of properties acquired for the	Sign off that adopted Property Management Plan incorporates provisions for demolition activities, fencing, inspection, vegetation removal, and interim land uses; sign	District	Initial plan sign-off one time only; regular inspection by construction manager during demolition and

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	development of the Flood Control Project. The Property Management Plan is described in Section 3.3 of Chapter 3 of this EIR. The Property Management Plan outlines District rental procedures, rental property management, relocation, criteria for demolition of structures, and interim uses of cleared lots. The latter could include leaving sites vacant, expanding the yards of adjacent District-owned properties; establishment of community gardens, and use of commercially zoned lots for temporary uses such as Christmas tree sales. The Plan contains mitigation recommendations which address relocation of residents, management of demolition activities, and management of cleared vacant lots. Relocation is addressed in the District's Relocation Assistance and Last Resort Housing Plan. Building demolition is addressed in the Hazardous Materials, Public Services and Utilities, Traffic, Noise, Air Quality, Water Quality, Biology, and Cultural Resources sections of this EIR. Properties that have been cleared of structures would be properly maintained to minimize disruptive effects on the community. The District has adopted post-demolition property management and maintenance procedures.	off after each property inspection visit; sign off on plan developed for each property; site inspection for maintenance of vacant lots, construction and maintenance of community gardens, and maintenance of temporary yard expansion areas; post sign with District number to call with complaints.		debris removal; inspection and sign-off after fence installation; inspection and sign-off weekly upon trash and weed removal; inspection and sign-off monthly of property used as community gardens and extensions of existing yards.
LU-3.	**Coordinate with Affected Residents to Reduce Impact of Abrupt Changes to Neighborhoods. Refer also to Mitigation Measure S-1.** In addition to the District providing relocation costs to displaced residents and other mitigation measures presented in the Socioeconomics section of this EIR/EIS, neighbors of the project and the affected households would be notified of the project, its importance, exact location in their vicinity and locations of housing removal and its expected timetable -- by mail and by posted notice.	Verify that mailings, including a map of the affected area, and notices have been issued before construction begins.	District	Mailings would occur at least 3 months and preferably 6 months before construction begins; sign-off one time only.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
SOCIOECONOMICS				
S-1.	**Provide Housing and Business Displacement Assistance.** The District has instituted a Relocation Assistance and Last Resort Housing Plan for the flood control project (October 1990). This Plan provides a framework to provide for the consistent administration of acquisition, appraisal and relocation programs by the District for this project. Its relocation assistance and payment procedures would be strictly applied. Information on relocation assistance is found in the District's Relocation Assistance Information guidelines, amended in 1989. This document is on file at the District and can be reviewed there.	Sign-off that Relocation Assistance and Last Resort Housing Plan incorporates appropriate provisions of Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970; sign-off that each property purchased is acquired in accordance with the terms of the Plan; follow-up contact with each property owner, resident, and business to ensure compliance with the Plan and prompt corrective action should non-compliance occur.	District	Initial plan sign-off one time only; sign-off of each purchase contract or relocation proposal; final sign-off after each relocation and follow-up contact. Follow-up to occur within 2 months of acquisition or relocation, whichever comes later.
TRAFFIC				
T-1.	**Establish Traffic Detours to Minimize the Disruption of Traffic Caused by Construction.** For the Curtner Avenue bridge, construction would be phased to maintain a minimum of one lane open to traffic at all times in each direction. The remainder of the traffic would be diverted to Malone Road. Hillsdale Avenue Bridge would be removed only after Pearl Avenue is in-place and Pearl Avenue Bridge is constructed. Construction of Virginia Bridge would divert traffic to Willow Street and West Alma Avenue. Construction of Willow Bridge would start only when Virginia Street is open for traffic. For the Alma Avenue bridge, phased construction would maintain a minimum of two lanes open to traffic at all times in each direction This could be accompiished by relocating the existing two eastbound lanes to the Elk's Lodge parking lot during construction	Verify that plans and specifications incorporate appropriate staging and detour requirements; site inspection to verify that construction contractor complies with specifications. If corrective action is necessary, revise specifications as needed to minimize traffic disruptions (i.e., for vicinity of Almaden Expressway).	District	Sign-off one time only; regular inspection by construction manager during construction.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	of the north half of the box culvert. Then, the westbound lanes would be moved back to allow construction of the remainder of the culvert. Willow Glen Way would be temporarily closed and traffic would be detoured to Alma Avenue and Malone Road during construction of Willow Glen Way Bridge. No two adjacent bridges would be closed at the same time. The Nightingale Drive box culvert construction would not occur simultaneously with the nearby Almaden Expressway work. Almaden Expressway construction at Canoas Creek and at Ross Creek would be planned to provide three lanes open in the peak traffic direction during peak hours. Also, one or more of the following measures for the vicinity of Almaden Expressway would be considered: • Schedule the construction during summer months when traffic is lighter • Schedule the two Canoas Creek box culvert projects during separate time periods • Install the culverts by boring and jacking • Use precast box sections for culvert construction To further mitigate the traffic impacts of construction detours, traffic management techniques such as the use of barricades and warning signs shall be applied.			
T-2.	**Minimize Disruption to Almaden Expressway by Specific Construction Scheduling Procedures.** Work on Almaden Expressway would minimize interference with either the northbound AM peak-hour or the southbound PM peak-hour weekday commute traffic. To maintain three lanes in each direction, construction at Canoas Creek (work site 2 on Figure 4.7-3) could occur in two stages. First, the three northbound lanes of Almaden Expressway would be relocated to the space currently	Verify that plans and specifications incorporate appropriate staging and detour requirements; site inspection to verify that construction contractor complies with specifications and that traffic disruption to Almaden Expressway is minimized.	District	Verify one time only; regular inspection by construction manager during construction.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	taken up by a right-turn lane and a frontage road. This would necessitate temporary closure of the turn lane and frontage road, during which time the west half of the new culvert would be built. Then the expressway lanes would be moved back to allow construction of the remainder of the culvert, after which the turn lane and frontage road could reopen. At Ross Creek, construction of temporary "shoofly" roadways could allow maintaining all six lanes of Almaden Expressway, with a three-stage construction schedule. First, utilizing the median and westerly shoulder, the northbound and southbound roadways would both be relocated westerly to allow construction of the eastern one-third of the proposed box culvert for Ross Creek. Second, the northbound lanes would be moved easterly to allow the center one-third of the culvert to be built. Third, utilizing the median, the southbound lanes would be moved easterly to allow the final one-third of the culvert to be finished, after which all the lanes would be relocated to their present position.			
T-3.	**Notify County Transit of Bridge Closures and Need for Rerouting.** Notification would occur so that bus lines can be rerouted and disruption to scheduling can be minimized.	Verify that plans and specifications incorporate appropriate notification requirements and adequate timing of notification.	District	Verify one time only; notification at least 4 weeks prior to bridge closures.
T-4.	**Establish Temporary Alternative Pedestrian and Bicycle Access.** When a bridge is closed to vehicular traffic, pedestrian bridge access would be provided so that access to schools and light rail transit stations is not blocked. When the Virginia Street and West Alma Avenue bridges are closed to vehicular traffic, temporary pedestrian facilities would be provided so that walking to and from the Virginia and Tamien light rail transit stations is not prevented. Any pedestrian bridge would be designed to accommodate bicycles also.	Verify that plans and specifications incorporate appropriate pedestrian and bicycle access; site inspection to verify that construction contractor complies with specifications and that pedestrian and bicycle access is maintained.	District	Verify one time only; regular inspection by construction manager during construction.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	The existing walkway along the Almaden Expressway frontage road between Ironwood and Redbird Drives would be maintained at all times. During complete closure of the Nightingale Drive/Canoas Creek crossing, pedestrians could divert to the frontage road walkway. Placement of adjacent concrete barriers (K rail) would protect pedestrians from high-volume high-speed expressway traffic.			
T-5.	**Minimize Traffic Disruption That Contractor Vehicles and Haul Trucks Could Cause During Construction by Establishing Haul Routes and Other Measures.** The contract documents and specifications would include certain restrictions on truck traffic. Truck travel on residential streets other than those where the actual project is located, such as Nightingale Drive, would be prohibited. The construction manager would monitor the movements of contractor vehicles to insure that trucks use the designated routes (no cutting through residential areas). Work on or near residential streets such as McLellan Street would be limited by time of day to prevent night-time disruption to nearby residents.	Verify that plans and specifications incorporate measure; site inspection to verify that construction contractor complies with specifications and that trucks use designated routes. Any complaints from residents would be recorded and immediate corrective action undertaken.	District	Sign-off one time only; regular inspection by construction manager during construction and immediate corrective action if necessary.
T-6.	**The District's Contractor Would Comply with all Railroad Company Regulations and Instructions Governing Railroad Operations and Property.** The District's contractor would comply with railroad company rules, regulations, and instructions governing the use of signals and flags for all railroad property, including directing train traffic, as a protection against accidents. The contractor would also comply with rules governing the protection of tracks and the traffic moving on such tracks, wires, and signals at or in the vicinity of the construction area. To avoid railway schedule delays or interruptions, the construction of the box culverts would be scheduled at times designated by the railroad.	Coordinate design and construction with railroad companies.	District, Railroad Companies	District coordination with railroad companies during the design phase. The railroads would oversee construction to ensure compliance.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
NOISE			
N-1. **Equip Construction Equipment With Standard Noise Control Devices and Implement Other Noise Control Measures as Necessary to Comply with the Local Plans or Development Permit Requirements.** Equipment types that meet Santa Clara Valley Water District noise standards of 83 dBA at 25 feet (77 dBA at 50 feet) would be used. Contractors would be permitted to use equipment which is capable of exceeding the noise levels of 83 dBA at 25 feet, provided that such equipment is operated in such a manner as not to exceed the limits. The overall construction impacts to the community would be lowered by 3 to 7 dBA. Possible noise control measures include: • All construction equipment operated at the project site shall be equipped with manufacturer's standard noise control devices (i.e., mufflers, lagging, and/or engine enclosures) which will normally achieve compliance with the noise limits. • No individual piece of equipment shall produce a noise level exceeding 83 dBA at a distance of 25 feet. • In no instance shall the noise level at any point outside of the property line or temporary construction area exceed 86 dBA. In residential areas, no construction would occur between the hours of 7:00 PM and 7:00 AM with City approval. • Temporary plywood barriers could be constructed along the backyards of adjacent residences. • Pavement breakers could be used in place of jackhammers. • Pumps for diverting water flows could be enclosed.	Verify that plans and specifications incorporate noise-control measures; site inspection to verify that construction contractor complies with specifications. Site inspection may require assistance by a skilled noise analyst to monitor noise levels. A noise complaint telephone number shall be made available for residents; any construction area with more than five complaints shall be surveyed by a qualified noise analyst, with additional mitigation provided as needed.	District	Sign-off one time only; regular inspection by construction manager during construction. Survey by noise analyst, if needed, within one day of receipt of more than five complaints.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
AIR QUALITY			
A-1. **Control Emissions During Construction.** In accordance with the District's standard construction specifications, emissions would be controlled to meet Bay Area Air Quality Management District regulations. These regulations require that exposed soils surfaces be watered in sufficient quantities to prevent dust raised from leaving the site. As a minimum, watering would be done in the late morning and after work is completed for the day. District specifications also require that idling of internal combustion engines would be held to an absolute minimum. Construction equipment would be properly maintained and tuned to minimize exhaust emissions. Spillage resulting from hauling operations along or across any public or private property would be removed immediately. Trucks transporting soil would be covered.	Verify that plans and specifications incorporate air quality measures; daily site inspection to verify that construction contractor complies with specifications. Records or construction equipment maintenance would be reviewed prior to construction to ensure proper maintenance scheduling (according to manufacturer's operations manual for the vehicle) to minimize exhaust emissions.	District	Sign-off one time only; continuous daily inspection by construction manager during construction - conditions causing excessive dust shall be corrected immediately.
PUBLIC SERVICES AND UTILITIES			
PSU-1. **Notify Police and Fire Protection Services Regarding Construction.** During the construction period, the District would notify the City of San Jose Police Department regarding road closures or other activities that would be likely to impede delivery of police services. Contact would also be made with the Crime Prevention Unit pertaining to accommodations for visibility and accessibility by emergency vehicles. The City's Fire Department requests similar notice of road closures during the construction period. The Department would need a 60 day advance notice to plan for modified responses to accommodate the constrictions or closures of West Virginia Street, Willow Street, West Alma Avenue, Willow Glen Way, Curtner Avenue, Hillsdale Avenue, and the areas south of Canoas Creek	Verify that authorities have been notified about each stage of construction. Notification for San Jose Police Department and County Communications would occur at least one week prior to road closures or other activities that may impede police access. The City's Fire Department would be notified at least 60 days in advance of road constructions/closures.	District	Sign-offs one time only. Notification within specified time frame of road constructions/ closures.

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	along Nightingale Drive. County Communications would also be notified of all road closures.			
PSU-2.	**Relocate Wells and Utilities Before Construction.** Relocation of the well fields in Reaches 9 and 11 must occur before construction begins. In order to prevent interruption of service, SCVWD would prepare and secure utility agreements and excavation permits from the San Jose Water Company and, if necessary, PG&E, to have utilities moved prior to the project's initiation. Whenever utilities are moved, a Utility Excavation Permit must be obtained from the San Jose Public Works Department prior to the initiation of project construction. The general conditions and requirements of such permits include the project's working hours, necessary traffic control devices, trench backfill and pavement restoration methods and coordination with other construction projects in the general vicinity. In addition, the SCVWD would need to secure from the department both standard and special encroachment permits. Utility excavation permits would be issued to utility companies with franchise agreements with the City of San Jose (Khouzam 1990).	Verify that plans and specifications incorporate measures; sign-off that wells are relocated and operational before construction begins; site inspection to verify that construction contractor complies with specifications; sign-off that Utility Excavation Permit obtained prior to initiation of project construction.	District	Sign-offs one time only; regular inspection by construction manager during construction.
PSU-3.	**Coordinate Relocation of Utilities.** Relocation of utilities would be coordinated with the appropriate utility company. All utilities relocation would be performed by the appropriate utility company unless directed otherwise by the company. Any damage to utilities would be repaired.	Verify that authorities have been notified about each stage of construction; immediate repair of any damaged utilities.	District	Sign-offs one time only; District inspection and monitoring of repairs.
PUBLIC SAFETY				
PS-1.	**Provide Warning Signs and Install Fencing and Barricades at Construction Sites.** Project construction areas would be posted with warning signs and would be adequately fenced and barricaded or equipped with other security measures to prevent unauthorized access during construction.	Verify that plans and specifications incorporate safety measures; site inspection to verify that construction contractor complies with specifications	District	Sign-off one time only; regular inspection by construction manager during construction.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
PS-2a. **Identify Truck Routes and Construction Zones Prior to Project Commencement.** Prior to commencing construction activities for any phase of the project, access routes for construction truck traffic would be identified and posted. Routes into construction areas would, to the maximum extent practical, avoid residential areas. Construction zones would be clearly marked and posted, and flag personnel used wherever necessary to direct traffic.	Verify that plans and specifications incorporate safety measures; site inspection to verify that construction contractor complies with specifications	District	Sign-off one time only; regular inspection by construction manager during construction.
PS-2b. **Notify Residents of Construction Schedules and Proposed Traffic Detours.** Notification would be given to residents and businesses in the surrounding area before construction begins. Alternate traffic and pedestrian routes for impacted areas would be posted.	Verify that plans and specifications incorporate safety measures; site inspection to verify that construction contractor complies with specifications	District	Sign-off one time only; regular inspection by construction manager during construction.
PS-3. **Limit Public Access to the River Channel by Installing Fencing and Posting Signs.** Permanent warning signs (e.g., no entry, no swimming or diving), fencing, barricades and/or other access control measures would be erected in areas along the channel, where necessary, to restrict or prohibit public access.	Verify that plans and specifications incorporate safety measures; site inspection to verify that construction contractor complies with specifications	District	Sign-off one time only; regular inspection by construction manager during construction.
VEGETATION			
V-1. **Prepare and Implement an Integrated Vegetation Mitigation Plan and a Public Education Program.** The District would prepare and implement a detailed mitigation plan to compensate for removal of riparian forest, shaded riverine aquatic (SRA) cover, urban forest, City ordinance trees, and wetlands and other jurisdictional waters of the United States. All of these planting needs would be integrated into a single plan because some plantings would provide compensation for more than one impact; plantings that compensate for different impacts would be implemented side-by-side at the same time; methods of planting, maintenance, and monitoring would be similar for all types of vegetation; and scheduling of planting, maintenance, and monitoring must be	Criteria for success of the mitigation plantings would be based on density of live woody plants per acre and plant species diversity during the initial 5-year establishment period. Specific criteria for tree and shrub densities would vary with the type of riparian community. Generally, plant loss exceeding 15 percent in the first year and 10 percent in each successive year (55 percent after 5 years) would be unacceptable and would necessitate remedial plantings	District	Finalize plan before construction begins; monitor success during 5-year establishment period as specified in the plan. On-going monitoring, if necessary, until success criteria are achieved.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
coordinated for all mitigation plantings. The integrated vegetation mitigation plan would provide detailed information on planting locations (specific to each vegetation type), plant materials (e.g., species, source, and size), planting methods (e.g., site preparation and plant spacing), maintenance methods (e.g., irrigation and weed control), monitoring methods (e.g., sample design, data requirements, survey frequency, and reporting requirements), and success criteria (e.g., species composition, percent survival, and percent canopy cover). This measure is expected to provide a net long-term increase in habitat quality along the Guadalupe River, because it would replace with native species all of the riparian forest removed during construction (much of which is dominated by non-native and weedy plants). The lag time between loss of habitat value and full compensation would be minimized by using a 2:1 replacement ratio and revegetating in the first fall planting season after reach construction. Goals, concepts, and guidelines that would be incorporated into the detailed mitigation plan are listed below. • Establish at least 18.97 acres of new riparian forest in Reaches 6-12. This goal is based on the 2:1 replacement ratio (based on canopy area) recommended by the Habitat Evaluation Team (see "Wildlife" chapter). • Plant tree and shrub species that are native to the local riparian system. Incorporate as much native plant material as possible into seed mixes of herbaceous plants used for erosion control. • Where possible, plant riparian vegetation for mitigation in existing gaps or openings (unvegetated or ruderal herbaceous areas) to reduce fragmentation and heterogeneity in the riparian corridor.	(Habitat Restoration Group 1992). Revegetation sites would be required to contain all the native species initially planted (although relative amounts may change) after 5 years. *Maintenance and Monitoring* Provide maintenance that would protect mitigation plantings and facilitate establishment of vigorous vegetation. Monitor the mitigation plantings in a manner that provides early feedback to the District and its revegetation contractors on methods to improve results or correct problems, allows a determination of when success criteria have been achieved, and provides the documentation needed for monitoring required under CEQA and by project permits.		

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
• Use percent survival, canopy cover, stem density, and species composition of planted vegetation as success criteria for the riparian forest. • Establish at least 5,096 linear feet of new vegetative cover by planting native riparian shrubs and trees (mostly willows) along unshaded banks. This provides the 1:1 replacement ratio needed to meet the SRA requirements. • Plantings intended to provide SRA cover would be planted along the water's edge at summer low flows and would be sufficiently dense to provide shade along at least 85 percent of the bank's length. At ground level, the width of plantings for riparian mitigation will vary from approximately 10 to over 30 feet because the space available for vegetation planting varies. In some areas, SRA cover will be planted on narrow strips of the low flow channel and floodway terraces that will be kept free of woody vegetation. In other areas, SRA cover will be planted where there are no constraints on planting widths. Only riparian plantings located within 15 feet of the wetted channel are considered as SRA mitigation. When mature, the widths of SRA plantings will exceed the ground level width by 10-59 feet, depending on the diameter of the canopies. • Establish at least 5.23 acres of new sycamore-valley oak forest in selected top-of-bank sites in Reaches 6-12. This goal is based on a 1:1 replacement ratio (based on canopy area). • Use native tree species in the urban forest revegetation sites, especially western sycamore, valley oak, coast live oak, California wild rose. • Comply with the City of San Jose's tree ordinance requirements for trees removed by the project that are not on District property. • Consult with the City Arborist to identify and evaluate trees			

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
greater than 18 inches DBH that would be removed by the project on land not owned by the District. Identify specific compliance and mitigation requirements when the number and value of affected trees have been determined. • Provide adequate compensation for removal of ordinance trees (typically 4:1 replacement based on tree number [Hamilton 1993]) and incorporate these trees into the mitigation plantings for riparian forest or urban forest, as appropriate. • Establish at least 1.85 acres of constructed jurisdictional wetlands to provide no net loss of wetlands within the project area. • Construct new wetlands in Reaches 10B and 12. Restore as much as possible of the temporarily disturbed wetlands on-site in Reach A and Reaches 6-13. • Use native plant species such as grasses, sedges (Carex spp.), water-plantain (Alisma spp.), and knotweeds (Polygonum spp.) that are flexible enough to be minimally disturbed by channel maintenance activities and minimize obstruction of flood flows. • Use jurisdictional wetland delineation criteria as a basis for success criteria for the constructed wetlands. • Provide at least 10.16 acres of constructed and restored other waters (at least a 1:1 replacement ratio) to compensate for other waters that are either disturbed or eliminated during project construction. • Locate all mitigation plantings in Reaches 6-13 and begin implementation of mitigation plantings in the early years of the multi-phase construction. • Where sites can be revegetated following construction disturbance or minor grading, implement mitigation directly on			

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
the sites that were disturbed. Implement the remaining mitigation plantings in appropriate locations that are currently unvegetated or occupied by ruderal vegetation or sparse, degraded riparian forest. • Plates V-41 through V-53 (in a separate volume) show anticipated locations of mitigation planting sites for riparian forest, urban forest, and wetlands. More detailed specifications of planting locations are to be included in the detailed mitigation plan. • Provide maintenance that would protect mitigation plantings and facilitate establishment of vigorous vegetation. • Monitor the mitigation plantings in a manner that provides early feedback to the District and its revegetation contractors on methods to improve results or correct problems, allows a determination of when success criteria have been achieved, and provides the documentation needed for monitoring required under CEQA and by project permits. • Follow the mitigation monitoring guidelines of the Corps (1991) for standards of wetland monitoring design and reporting. Riparian and wetland plantings would be monitored for at least 5 years, including at least 2 years after the removal of irrigation systems.			
The District would prepare and implement a program to educate the community and creekside homeowners about biological mitigation and habitat protection associated with the project and to solicit their cooperation and support. Principal actions would include: • Developing an educational brochure on proper stream care to be distributed to homeowners along the Guadalupe River within the environs of the project area before construction begins. This brochure would explain: 1) the reasons for the removal of non-	Verify that brochure was distributed and workshops conducted.	District	Develop and distribute educational brochure to homeowners along the Guadalupe River in the project area before construction begins; conduct workshops before and

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	native vegetation, 2) the values of native vegetation along the riparian corridor and on private property, 3) reasons for not dumping debris, 4) related issues concerning water quality, and 5) guidelines for aesthetic improvement. • Conducting a series of workshops for creekside homeowners before and after project construction to explain the riparian mitigation program to be implemented, the value of riparian habitat to wildlife, and the goals of the mitigation program.			after project construction in conjunction with vegetation plan and channel maintenance program.
V-2.	**Implement a Vegetation Protection Plan for Riparian and Urban Forests.** The District would prepare and implement a plan to protect vegetation that does not need to be removed during project construction from inadvertent damage. This plan would incorporate standard construction practices used by the District and described in the project description. Before construction begins, a survey would be conducted to identify and flag locations of construction area boundaries, specific trees near or within construction areas that are to be saved, and selected trees that may be transplanted to a mitigation area. Orange plastic barricade fencing would be erected or similar measures taken along construction area boundaries to identify areas of protected vegetation. The fencing would be placed as close to the actual limit of grading or construction (i.e., as far from the forest edge) as possible. If practical, selected trees within construction areas may be transplanted for use in a designated mitigation area by an experienced tree-moving contractor. During construction, attachment of ropes, cables, or guys to trees outside the construction area would be avoided, except in emergencies. Trees not designated for removal that are damaged during construction would be trimmed under the direction of a qualified arborist to minimize the risk of disease. Trees outside the construction area that are damaged beyond recovery would be	Flag locations to be protected and fenced; construction manager to regularly inspect fenced areas; sign-off that trees damaged during construction were treated or replaced at a minimum 3:1 ratio	District	Conduct preconstruction survey before construction begins, regular inspections during construction

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	replaced at a minimum 3:1 basis with additional native trees in a designated riparian forest mitigation area or shaded riverine aquatic habitat cover mitigation area.			
	The District would replace or compensate property owners for any native or non-native backyard trees that die or become severely stressed as a result of flood wall construction or other construction-related activities. Replacement may be provided on a 1:1 in-kind basis for trees with drip lines within 10 feet of project construction that die or become severely stressed during construction, or within 1 year after completion of construction for trees that are determined by a qualified arborist, on a case-by-case basis, to have been affected by project construction.	Verify that replacement policy for damaged trees is included in educational brochure to be distributed to homeowners and that all damaged trees have been replaced or compensated	District	District to replace trees for up to 1 year following construction.
V-3.	**Revegetate Erosion Repair Sites with Riparian Vegetation.** The District would incorporate live willow cuttings and other plant materials into the erosion repair treatments as specified in the maintenance program included in Appendix C, and would revegetate all areas cleared for access to the erosion repair sites with native riparian vegetation. This mitigation measure is similar to the riparian mitigation called for in Mitigation Measure V-1; however, the replacement ratio for erosion repair sites is 1:1 (not 2:1 as in Mitigation Measure V-1). The mitigation goal for the erosion repair sites is 1:1 because the initial impact resulted from natural causes (flooding), the proposed repair methods will allow for on-site recovery of riparian vegetation, and the sites will be less susceptible to erosion after the repairs are completed.	Refer to Mitigation Measure V-1		
WILDLIFE				
WL-1.	**Refer to Mitigation Measures V-1 and V-2.**			
WL-2.	**Refer to Mitigation Measures V-1 and V-2.**			
WL-3.	**Refer to Mitigation Measure V-2.**			

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
WL-4. **Refer to Mitigation Measures V-1, V-2, and V-3.**			
WL-5. **Refer to Mitigation Measure V-1.**			
WL-6. **Refer to Mitigation Measure V-2.**			
WL-7. **Refer to Mitigation Measures V-1 and V-2.**			
WL-8. **Conduct Burrowing Owl Survey and Avoid Adverse Impacts on Burrowing Owls if Present.** The District would conduct burrowing owl surveys in Reach 12 and Reach A during the nonbreeding season (September-January) and no more than 2 weeks before construction begins to determine whether burrowing owls are occupying the project site before construction. Within 30 days of conducting the survey(s), the District would submit results to DFG. If no burrowing owls exist at the project site, no additional mitigation measures would be required. If survey results reveal the presence of owls, monitoring by a qualified wildlife biologist would be required during construction activities and the District would provide a letter report of monitoring activities to DFG. If surveys determine that burrowing owls are present, the District would implement one of the following mitigation measures, depending on when construction is scheduled to occur. • If construction occurs during the nonbreeding season (September-January), the District would avoid construction within 160 feet of the active burrow to avoid disturbing or killing the burrowing owls. This schedule would comply with laws under the California Fish and Game Code, the federal Migratory Bird Treaty Act, and DFG's burrowing owl guidelines. Monitoring potential wintering burrows would be necessary to ensure that no owls were killed during grading. A qualified wildlife biologist would survey the affected area within 2 weeks before construction activity begins to determine	If surveys determine presence of owls, a qualified wildlife biologist will monitor construction activities in Reach 12 and Reach A; monitoring actions depend on construction schedule (whether during breeding or nonbreeding season) If owls are present and construction occurs during September-January, the District will fence active burrows to avoid construction activities within 500 feet If owls are present and construction occurs during February-August, the District will exclude owls from project area before breeding season begins and prevent them from returning by ongoing monitoring actions during construction activities.	District	Sign-off that burrowing owl survey(s) were conducted in Reach 12 and Reach A during nonbreeding season (September-January) and no more than 2 weeks before construction begins; provide results of survey(s) to DFG within 30 days of completion. If survey results reveal presence of owls, the District will submit letter report of monitoring activities to DFG within 60 days of completion of construction activities in each affected reach

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
if active burrows are present. After determining that active burrows are unoccupied, the burrows would be destroyed to prevent reoccupancy during construction. • If construction occurs during the breeding season (February-August), the District would exclude the owls from the project area before the breeding season began and prevent the owls from returning by the following actions: examining all potential burrows in Reach 12 and Reach A during the nonbreeding season (September-January) to determine the presence or absence of owls; destroying or collapsing unoccupied burrows to prevent their use during the nonbreeding and breeding seasons; and monitoring the project site and continuing to destroy burrows until grading begins to ensure that new burrows constructed by ground squirrels are not occupied by owls and used as dens. • If no other options are available, relocate burrowing owls. The District would prepare a relocation plan in coordination with DFG and USFWS and obtain permits from both DFG and USFWS.			
WL-9. **Refer to Mitigation Measure V-1.**			
FISHERIES			
F-1. **Construct Undercut Banks Onsite, Replace SRA Habitat, and Improve Fish Passage Conditions on Guadalupe Creek.** The District would mitigate construction-related impacts on undercut banks and short-term temperature impacts associated with vegetation clearing during construction by implementing the following specific measures: • Improve Fish Passage Conditions at Upstream Tributaries. The District would improve fish passage conditions at Guadalupe Creek, where a channelized stream reach midway between the	The District would implement a two-phase monitoring program of fish passage improvements (i.e., Mason Dam, the Blossom Hill drop structure, and the channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road) to determine the success of the improvements: annual surveys	District	DFG and USFWS review of fish passage design during design; the District will submit report of monitoring results to DFG and USFWS annually for up to 5 years after completion

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
Pheasant Creek confluence and Reynolds Road restricts fish migration to upstream areas (Figure 4.14-3), and at stream gage Station No. 43. Fish passage structures would be designed in consultation with DFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained.	(phase one) to determine whether fish are using the structures and ongoing maintenance surveys in perpetuity (phase two) to ensure that structures are operating as designed. No monitoring of Stream Gage Station No. 43 is proposed because only minor modifications to the weir are needed to improve fish passage, precluding the requirement to build an actual fish passage structure such as a fish ladder. The District would develop an appropriate monitoring program in coordination with DFG and USFWS to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout) at the Blossom Hill drop structure, Mason Dam, and the channelized stream reach midway between the Pheasant Creek confluence and Reynolds Road. Phase one of the monitoring program would commence in the fall following completion of fish passage improvements. Monitoring would be conducted from October 1 to April 30, when migrating adult chinook salmon and steelhead trout are expected to occur. Potential monitoring activities could consist of visual surveys at improvement locations; carcass,		of improvements; if fish passage objectives are not met, the District will initiate remedial actions and continue monitoring and reporting to DFG and USFWS for up to an additional 5 years.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
	redd, and juvenile surveys in reaches upstream of improvement locations; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol would be developed in consultation with DFG and USFWS and would depend on the opportunities and constraints governed by the local conditions. Phase two of the monitoring plan would include repeated surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishways are free of obstructions and debris that could preclude their normal operation. The District would follow the same maintenance and inspection procedures as outlined in an existing MOU with DFG, and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current MOU requires the District to inspect all fish ladders once every working day and at least once per day during high flow events on nonworking days during the migration season. This phase of the		

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
	monitoring program would continue for the life of the improvement structure. The District would submit an annual monitoring report to DFG for up to five years after completion of fish passage improvements. If the objective of attaining fish passage has not been met and is not due to factors beyond the District's control (e.g., drought or downstream barriers), remedial actions would be initiated and monitoring would continue for up to an additional five years. Remedial actions could include redesign of structural improvements or further negotiations with DFG and USFWS regarding other appropriate mitigation. This measure would be considered successful when fish passage was documented and no indicators of passage problems are present. Monitoring would no longer be required.		
• Construct 1,720 Linear Feet of Undercut Banks, Using Appropriate Biotechnical Techniques. In consultation with DFG and USFWS, the District would design and install appropriate revetment materials in association with replanted vegetation, to create 1,720 linear feet of undercut bank habitats. This measure would compensate for the loss of undercut banks during grading	Document existing 1,720 linear feet of undercut bank habitat (water depth, velocities, and depths of undercut); design and install natural revetment materials in consultation with DFG and USFWS; evaluate	District	Document existing habitat before construction begins; DFG and USFWS review during design and installation; the

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	and streambank excavation at a 1 to 1 ratio. Before initiating construction, the existing 1,720 linear feet of undercut banks would be documented in terms of water depths, velocities, and depths of undercut to provide detailed information on existing conditions. Undercut bank mitigation areas would be located in Reaches 7, 10A, 10B, 11A, 11B, and 11C. Mitigation areas would be evaluated annually for five years to determine whether created undercut banks are functioning properly by providing habitat conditions similar to those that were measured for existing conditions. If full mitigation cannot be achieved by created banks, the District would consult with DFG and USFWS, initiate remedial actions, and continue monitoring for an additional five years. Remedial actions could include redesign of revetment or other appropriate mitigation based on negotiations with DFG and USFWS.	effectiveness of mitigation. Mitigation would be considered complete in the fifth year if created undercut bank lengths provide habitat conditions similar to those measured for preproject conditions.		District will evaluate mitigation areas and submit monitoring report to DFG and USFWS annually for 5 years after installation; the District will initiate remedial actions in consultation with DFG and USFWS if created banks do not fully mitigate for lost banks and evaluate and report on monitoring actions for additional 5 years.
F.2	**Provide 5,096 Linear Feet of SRA Habitat.** (See Mitigation Measure V-1, Vegetation.)	See Mitigation Measure V-1, Vegetation.	District	Finalize plan before construction begins; monitor success during 5-year establishment period as specified in the plan.
VISUAL/AESTHETICS				
V/A-1a.	**Locate Staging and Storage Areas Outside Visually Sensitive Areas.** The District would locate staging, heavy equipment storage, and construction material storage areas outside visually sensitive areas (identified in Table 4.15-1) where feasible. If staging areas cannot be located outside visually sensitive areas, the District would screen these areas from general viewing. Screening	Verify that plans and specifications document staging/storage areas; Construction manager to document location of staging area outside visually sensitive area or installation of screening material	District	Sign-off one time only; construction manager to inspect regularly during construction

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	may be accomplished using natural wood fencing (minimum 5-foot-high) or other natural-appearing screening material that effectively screens views of equipment storage areas.			
V/A-1b.	**Minimize Areas of Surface Disturbance by Minimizing Clearing and Grading.** The District would minimize areas of surface disturbance by minimizing clearing and grading. Existing trees and other vegetation would be protected and left undisturbed, wherever possible. Grading would minimize erosion and conform to the natural topography, wherever possible. (Also, refer to Mitigation Measure WQ-1 in Section 4.3, Water Quality, which recommends that the District prepare and implement a Stormwater Pollution Prevention Plan.)	Verify that plans and specifications minimize clearing and grading activities	District	Sign-off one time only; construction manager to inspect regularly during construction
V/A-1c.	**Restore Graded Areas to Original Contours and Revegetate Cleared Areas.** The District would revegetate cleared areas and restore graded areas as closely as possible to their original contours (refer to Mitigation Measure V-1 in Section 4.12, Vegetation, which recommends that the District prepare and implement an integrated vegetation mitigation plan). Site-specific restoration plans would be included in the mitigation plan for the project, which would be prepared following public review of the Draft EIR/EIS. Table 4.15-2 summarizes Impact V/A-1 and associated mitigation measures. Impacts in each reach are identified and site-specific details on implementing the mitigation measures in visually sensitive areas are provided.	Monitoring for restoration activities will be included in the vegetation mitigation plan	District	Begin restoration activities within 30 days of completion of construction
V/A-2.	**Reestablish Views of Vegetation of High Visual Interest or Aesthetic Value.** The District would reestablish views of vegetation of high visual interest or aesthetic value that have been removed in visually sensitive areas as part of project implementation. Vegetation would be established that is typical of native riparian and closely associated plant communities in	Verify that site-specific applications in Table 14.5-2 are incorporated into project design and implemented.	District	Incorporate site-specific applications into project design; initiate applications within 30 days of completion of

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	California, provides high visual interest, is locally scarce or unique, and is considered to be of high aesthetic value locally (e.g., valley oaks, coast live oaks, sycamores, toyon, and cottonwoods). Table 4.15-2 identifies this impact by reach and provides site-specific details on implementing the mitigation measure in visually sensitive areas.			construction.
V/A-3.	**Screen Views of Visually Incongruous Elements Resulting from Project Implementation.** The District would screen views of visually incongruous elements in visually sensitive areas resulting from project implementation. The District would establish vegetation of mixed height, using locally native riparian species wherever feasible. Vegetation would be established using trees that reach a height of at least 20 feet in ten years and shrubs and small trees that would reach a height of at least 6 feet in five years. Vegetation with foliage present would effectively achieve a minimum of 50 percent screening in five years and 75 percent screening in ten years. Visual treatments that apply to this measure are the same as those described below for Mitigation Measure V/A-4. Table 4.15-2 identifies this impact by reach and provides site-specific details on implementing the mitigation measures in visually sensitive areas.	Verify that site-specific applications in Table 14.5-2 are incorporated into project design and implemented.	District	Incorporate site-specific applications into project design; initiate applications within 30 days of completion of construction.
V/A-4.	**Maintain the Natural Character of the River Corridor.** The District would maintain natural-appearing views of the river corridor by breaking up straight lines and regular engineered forms to soften their impact. This would be accomplished by using materials with colors and textures that commonly occur in natural river corridors of the region along the Guadalupe River and channel banks. Visual treatments would include: • Planting native flowers, vines, and ground covers in openings in crib walls to soften the engineered lines. The vines and	Verify that materials with colors and textures that commonly occur in natural river corridors are used and that site-specific applications in Table 14.5-2 are incorporated into project design and implemented.	District	Incorporate site-specific applications into project design; initiate applications within 30 days of completion of construction.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
groundcovers would be spaced approximately 10 feet on center with interplantings of flowers on the entire crib wall. • Planting native ruderal vines and brambles in gabion walls to soften the engineered lines. The plantings would be spaced approximately 10 feet on center and located on the top one-half of the gabion slope. • Planting pockets. Planting pockets would be 3 feet wide by 6 feet long and contain one small native tree or tall native shrub and two blackberry thickets). Planting pockets would be used to screen undesirable views, as follows: – 15 feet on center. Planting pockets would be located 15 feet on center in the upper one-third of the gabion wall, for the entire section described. This spacing would provide reasonable canopy cover within 5 years for riparian trees such as willow, cottonwood, box elder, and oak. – Cluster plantings. These planting pockets would be located 15 feet on center in clusters of 10 or more in the upper one-third of the gabion wall. The clusters would be no more than 100 feet apart. Clustering planting pockets would provide undulation of the vegetative line when viewed down the channel from a bridge. – Top-of-bank screens. Native evergreen trees and shrubs would be planted at the top of bank in appropriate areas. The plants would be spaced no more than 8 feet on center, and the planting area would be at least 16 feet wide.			
V/A-5. **Blend New or Altered Structures with Their Surroundings.** The District would blend new structures or alterations to existing structures with their surroundings by using forms, lines, colors, and textures that are consistent with the surroundings. Subdued tones (e.g., shades of brown, tan, and gray) would be used for structures.	Verify that forms, lines, colors, and textures that are consistent with the surroundings are used; sign-off that site-specific applications in Table 14.5-2 are incorporated into project	District	Incorporate site-specific applications into project design; initiate applications within 30 days of

TABLE 8.1 (continued)

	Mitigation Measure	Monitoring Action	Responsibility	Schedule
	Textures would generally be coarse and varied. Smooth or shiny surfaces and white or other bright colors would not be used. Forms and lines would be broken up to avoid straight edges and forms that are out of scale with their surroundings. Table 4.15-2 identifies this impact by reach and provides site-specific details on implementing this mitigation measure in visually sensitive areas. Successful implementation of this measure would reduce this impact to a less-than-significant level.	design and implemented		completion of construction.
HISTORIC AND ARCHAEOLOGICAL RESOURCES				
AH-1.	**Monitor Construction Activities to Identify Archaeological Resources.** To mitigate potential construction impacts, a qualified archaeologist would periodically monitor soil-moving construction activities to check soil conditions and to assess the presence of archaeological deposits in sensitive areas of sites CA-SCl-186, -187, -362, and -674. Extensive monitoring of all soil-moving construction activities at the sites CA-SCl-294, 690, and -706 would be conducted due to the likely presence of human burials. Extensive monitoring is also required at CA-SCl-635H to document the depth and extent of this feature.	For McLellan Avenue site and sites CA-SCl-186, CA-SCl-187, CA-SC1-294, CA-SCl-362, CA-SCl-674, and CA-SCl-635H, soil-moving shall be monitored by qualified archaeologists to check soil conditions and assess the presence of archaeological resources. If any archaeological resources were identified, appropriate mitigation measures would be developed by the qualified archaeologist and implemented, with verification of compliance by the construction manager.	District	Occasional monitoring for sites CA-SC1-186, CA-SC1-187, CA-SC1-362, CA-SC1-674, and CA-SC1-635H with archaeologist to be notified of all soil-moving activities in sensitive areas. Continuous monitoring during all construction at the McLellan Avenue Site and CA-SCl-294.
AH-2.	**Preserve Historical Resources Where Possible; Document and Salvage Significant Elements where Structural Demolition is Necessary.** Five residential structures within the project alignment have marginal architectural value. These structures are 334 Grant Street, 693 and 171 Palm Avenue, 960 McLellan Avenue and 760 Malone Road. The San Jose Historical Museum, Victorian Preservation Association, or other interested parties would be	An archaeologist shall ensure that appropriate preservation, relocation, salvage, or documentation has occurred prior to construction.	District	Sign-off before construction.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
offered the opportunity to salvage architectural elements from these structures for use in the restoration of similar historic structures. Cultural resources at the Valley View Packing Company on Hillsdale Avenue would be preserved, if possible. If preservation of the structure and prune dehydrator is not possible, relocation would be considered. Minimal mitigation would include photographic and archival documentation, oral interviews with the Rubino family, and salvage of significant elements.			
CUMULATIVE			
Vegetation			
Cv-1a. **Minimize Recreational Impacts on Riparian Vegetation.** To minimize indirect impacts on remaining riparian vegetation and revegetation areas, the District would incorporate the following measures into the project if the City of San Jose designates the flood control project's maintenance roads as trails in the Guadalupe River South Corridor Park Project. • The permanent maintenance road would, if possible, not be sited in the revegetation areas in Reach 12 to avoid disturbance of mitigation plantings. • The perimeters of riparian mitigation revegetation sites accessible to recreational users would be fenced and posted with "Mitigation Area, Please do Not Disturb" signs until the vegetation has become well established (an estimated 5-8 years). • Where possible, dense vegetative screening would be planted between trails or maintenance roads and revegetation sites. • Maintenance roads on floodway terraces would be located as far as possible from the river.	District Engineer will sign off that measures are incorporated into project design; site inspection (quarterly to verify maintenance of signs and fencing).	District	Incorporate measures into design phase; fence and post signs along perimeter at completion of revegetation sites; maintain signs and fencing up to 8 years until vegetation is fully established.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
• The District would continue to be fully involved in the planning of the trail system for the Guadalupe River Corridor South Park so as to protect the mitigation sites and natural areas.			
Cv-1b. **Implement Revegetation during the First Fall Planting Season after Reach Construction.** To minimize the delay between project impacts on riparian habitat and the attainment of full compensation in revegetation areas, the District would revegetate during the first fall planting season after completing construction in each reach. In addition, the District has revised its construction schedule to complete improvements in Reaches 12 and 10B before initiating construction in the remaining reaches. Because Reaches 12 and 10B contain most of the mitigation vegetation, completing construction in these reaches before constructing improvements in other reaches would allow for the earliest possible establishment of mitigation vegetation. The District would implement all revegetation in Reaches 12 and 10B during the first fall planting season after reach construction.	District Engineer will verify that revegetation is completed for each reach and that construction in Reaches 12 and 10B are completed before initiating construction in other reaches	District	First fall planting season after completing construction in each reach
Fisheries			
Cf-1a: **Provide for Fish Passage on Alamitos Creek and Monitor for the Presence of Native Fish.** The District would provide for fish passage at the gabion structure on Alamitos Creek upstream of Mazzone Drive. Fish passage devices would be designed in consultation with DFG and USFWS and incorporate engineering considerations and biological criteria developed for fish passage to ensure that adequate fish passage is maintained. Implementing mitigation measures Cf-1 and F-1 would allow access to approximately 18 miles of more suitable upstream spawning and rearing habitat, which would result in a significant, long-term beneficial impact on fishery resources.	The District would implement a two-phase monitoring program of the fish passage improvements at Alamitos Creek to determine the success of the improvements: annual surveys (phase one) to determine whether fish are using the structures, and ongoing surveys in perpetuity (phase two) to ensure that structures are operating as designed. The district would develop an appropriate monitoring program in coordination with DFG and USFWS	District	DFG and USFWS review of fish passage design during design; the District will submit report of monitoring results to DFG and USFWS annually for up to 5 years after completion of improvements; if fish passage objectives are not met, the District will

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
	to document the successful passage of migratory fish (primarily chinook salmon and steelhead trout) at the gabion structure on Alamitos Creek. Phase one of the monitoring program would commence in the fall following completion of fish passage improvements. Monitoring would be conducted from October 1 to April 30, when migrating adult chinook salmon and steelhead trout are expected to occur. Potential monitoring activities could consist of visual surveys at the improvement location; carcass, redd, and juvenile surveys in reaches upstream of the improvement location; automated fish counting systems mounted at each fish passage structure; or a combination of two or more methods to document the successful passage of adults. The precise sampling protocol would be developed in consultation with DFG and USFWS, and would depend on the opportunities and constraints governed by the local conditions. Phase two of the monitoring plan would include surveys during the rainy season (i.e., October 1 through April 30) to ensure that the fishway		initiate remedial actions and continue monitoring and reporting to DFG and USFWS for up to an additional 5 years.

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
	is free of obstructions and debris that would preclude their normal operation. The District would follow the same maintenance and inspection procedures as outlined in an existing MOU with DFG, and take reasonable and appropriate measures to remove accumulated debris in a timely manner to restore to normal the operation of the fishway. The current MOU requires the District to inspect all fish ladders once every work day and at least once per day during high flow events on nonworking days during the migration period. This phase of the monitoring program would continue for the life of the improvement structure. The District would submit an annual monitoring report to DFG for up to five years after modification of migration obstacles. If the objective of attaining fish passage at the three locations described above has not been met, remedial actions would be initiated and monitoring would continue for up to an additional five years. Remedial actions could include redesign of structural improvements or further negotiations with DFG and USFWS regarding other appropriate mitigation.		

TABLE 8.1 (continued)

Mitigation Measure	Monitoring Action	Responsibility	Schedule
	This measure would be considered successful when fish passage was documented and no indicators or passage problems are present. Monitoring would no longer be required.		

CHAPTER 9

AGENCY AND PUBLIC INVOLVEMENT

CHAPTER 9

AGENCY AND PUBLIC INVOLVEMENT

9.1 AGENCY ENVIRONMENTAL REVIEW AND CONSULTATION REQUIREMENTS

The Guadalupe River Flood Control Project EIR/EIS has been prepared concurrently with environmental review and consultation required by federal environmental law other than NEPA, as required by 40 CFR 1502.25. Compliance with specific environmental laws and agency consultation requirements is described below.

Fish and Wildlife Coordination Act (16 USC Sec. 661 et seq.)

The Fish and Wildlife Coordination Act (FWCA) requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and state fish and game agencies (in this case the California Department of Fish and Game) before undertaking projects that control or modify surface water (water projects). This consultation is intended both to promote the conservation of wildlife resources by preventing loss of or damage to wildlife resources and to provide for the development and improvement of wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to include in project reports recommendations made by the USFWS and state fish and game agencies, to give full consideration to these recommendations, and to include in project plans justifiable means and measures for wildlife purposes.

Coordination with the USFWS and California Department of Fish and Game (CDFG) has occurred throughout the preparation of the EIR/EIS. The USFWS and CDFG participated in an agency scoping meeting held on 13 February 1990. CDFG also documented their concerns in responses to the Notice of Preparation. Both agencies will receive copies of the Draft EIR/EIS, and their comments will be fully evaluated and responded to in the final EIR/EIS. Additional consultation with regulatory agencies is discussed in section 9.2, below.

Endangered Species Act (16 USC Sec. 1531 et seq.)

Section 7 of the Endangered Species Act (ESA) requires federal agencies, in consultation with the Secretary of the Interior, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. The required steps in the Section 7 consultation process are as follows:

- Agencies must request from the USFWS information on the existence within a project area of listed species or species proposed for listing;
- Following receipt of the USFWS response to this request, agencies can prepare a Biological Assessment to determine whether any listed species or species proposed for listing are likely to be affected by a proposed action;
- Agencies must initiate formal consultation with the USFWS if the Proposed Action affects listed species;
- The USFWS must prepare a Biological Opinion to determine whether the action would jeopardize the continued existence of listed species or adversely modify their critical habitat;
- If a finding of jeopardy or adverse modifications is made in the Biological Opinion, agencies must modify their project to ensure listed species are not jeopardized or their critical habitat adversely modified, unless an exemption from this requirement is granted.

The biotic resource analysis indicates that no listed or proposed species would be affected.

National Historic Preservation Act (16 USC Sec. 470 et seq.)

The National Historic Preservation Act of 1966 (NHPA) established the National Register of Historic Places (National Register), a listing of sites, districts, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to evaluate the effects of proposed undertakings on historical, archaeological and cultural resources. Agencies are required, within the vicinity of proposed projects, to identify historical or archaeological properties, including properties on the National Register of Historic Places, and those that the agency and the State Historic Preservation Officer (SHPO) agrees are eligible for listing in the national register. If the federal project is determined to have an adverse effect on national register properties or those eligible for listing in the national register, the agency is required to consult with the SHPO and the Advisory Council on Historic Preservation to develop alternatives or mitigation measures to allow the project to proceed.

An historic and archaeological resources evaluation was conducted by Archaeological Resource Management, and one structure (an historic prune dehydrator) was identified as a potentially significant resource according to criterion ("A") for the National Register. No other structures or properties were identified as listed or eligible under the NHPA. In addition, there is one significant prehistoric site, CA-SC1-294, and one potentially significant site on McLellan Avenue that would be affected by the project. Other, less significant sites are also located in the project area, but would not be expected to be seriously affected by the project. The historic and archaeological investigation is summarized in the Historic and Archaeological Resources section of Chapter 4.

Farmlands Policy

The Council on Environmental Quality (CEQ) memoranda to Heads of Agencies, dated August 30, 1976, and August 11, 1980, and the Farmlands Protection Policy Act of 1981 require agencies in their environmental documents to include farmlands assessments designed to minimize adverse impacts on prime and unique farmlands.

As presented in the Land Use and General Plan Considerations section of Chapter 4, no farmlands would be impacted by this project.

Executive Order 11988 - Floodplain Management

Executive Order (EO) 11988 requires federal agencies to prepare floodplain assessments for proposals located within or affecting floodplains. If any agency proposed to conduct an action within a floodplain, it must consider alternatives to avoid adverse effects and incompatible development in the floodplain. If the only practicable alternative involves siting in a floodplain, the agency must minimize potential harm to or within the floodplain and explain why the action is proposed within the floodplain.

As evaluated in the Hydrology and Water Quality sections of this document, the proposed project is in compliance with the order because it would reduce the hazards and risks associated with floods and minimize the impacts of floods on human safety, health and welfare.

Executive Order 11990 - Protection of Wetlands

EO 11990 requires federal agencies to prepare wetlands assessments for proposals located within or affecting wetlands. Agencies must avoid undertaking new construction located in wetlands unless no practicable alternative is available and the proposed action includes all practicable measures to minimize harm to wetlands. The project alternatives would involve new construction located in wetlands. The District has determined, through an evaluation of alternatives (refer to Sections 3.1 and 3.2 of this EIR/EIS) that there is no practicable alternative that would satisfy flood control objectives, without wetland impact.

The project would remove of about 3.8 acres of wetland, which would be replaced as part of the revegetation program.

Clean Water Act (PL95-217 and 404(b)(1)

The objective of the Clean Water Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Section 404 (b)(1) of the Clean Water Act as amended in 1977, requires that the Corps of Engineers evaluate the impacts of the discharge of dredged or fill material into waters of the United States. Any person or public agency proposing to excavate or discharge dredged or fill materials into water of the United States must obtain a 404 permit from the U.S. Army Corps of Engineers. Under Section 404 of the Clean Water Act, the Corps' jurisdiction over navigable waters has been expanded to include all waters that are subject to the ebb and flow of the tide; all interstate waters including wetlands; all other waters such as intrastate lakes, rivers, streams (including intermittent

streams), mudflats, wetlands, sloughs, wet meadows, natural ponds, and wetlands adjacent to waters of the United States. A Section 404 Permit will be needed for any construction within the project area.

Wild and Scenic Rivers Act (16 USC 1274 et seq.)

The Wild and Scenic Rivers Act establishes requirements applicable to water resources projects affecting wild, scenic or recreational rivers within the National Wild and Scenic Rivers System as well as rivers designated on the National Rivers Inventory to be studied for inclusion in the national system. Under the Act a federal agency may not assist the construction of a water resources project that would have a direct and adverse effect on the values for which a river in the National System or study river on the National Rivers Inventory was established.

The Guadalupe River is not included in the National System, nor is it designated to be studied for inclusion.

9.2 AGENCY AND PUBLIC PARTICIPATION

Scoping

A joint EIR/EIS is required for this project in order to meet the requirements of the Clean Water Act, National Environmental Policy Act (NEPA), and California Environmental Quality Act (CEQA). The Corps of Engineers is the lead agency under NEPA, as discussed in Section 2.4 of this EIR/EIS. A Notice of Intent to Prepare an Environmental Impact Statement was published by the Corps on 18 April 1989 as required by NEPA. A Notice of Preparation of an Environmental Impact Report was issued by the Santa Clara Valley Water District in April 1990. An agency scoping meeting was held on 13 February 1990. This meeting was attended by representatives of the City of San Jose, U.S. Army Corps of Engineers (Corps), U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG).

Resource Agencies Participation

The U.S. Fish and Wildlife Service, the California Department of Fish and Game and the U.S. Army Corps of Engineers are the main resource agencies involved in this project. The San Francisco Regional Water Quality control Board (RWQCB) has been involved in water quality aspects of the project.

A Habitat Evaluation Procedures Conference with participating resource agencies (CDFG, USFWS, and Corps) was conducted in January 1993. The purpose of this meeting was to review the District terrestrial riparian Habitat Evaluation Procedures (HEP) for the project. The HEP recommended a 0.8:1 mitigation ratio. The USFWS recommended a 2:1 ratio be used to compensate for the loss of riparian habitat. This mitigation ratio has been used in this EIR/EIS and is the basis for the mitigation plan outlined in the biotic resources analyses.

Agency staff requested that Shaded Riverine Aquatic (SRA) habitat be identified and loss of undercut banks and overhead shade be mitigated.

An all day workshop with the resource agencies was held in December 1994. An Administrative Draft EIR/EIS was presented to staff from the CDFG, USFWS, Corps, and RWQCB. These agencies expressed concern about riparian mitigation ratios, water release, inflatable dams, and in-stream percolation ponds. As a result of the meeting the proposed inflatable dams were removed from the project and the mitigation area between Branham Lane and Blossom Hill Road was redesigned to provide streamside riparian mitigation.

In February 1995 the CDFG and USFWS submitted written comments on the Administrative Draft EIR/EIS. Concerns regarding riparian mitigation ratios, river setback/buffer zones, operation of inflatable dams, and in-stream recharge programs were expressed. Several modifications to the project were proposed.

The District has proposed implementation of a 2:1 riparian mitigation ratio which is consistent with the Habitat Evaluation Plan analysis. The mitigation plan provides creek bank mitigation in Reach 12 for loss of riparian habitat in other reaches of the project area. This project includes a five-year mitigation monitoring plan. As indicated above, installation of inflatable dams is not part of this project. The District considered a 100-foot buffer zone along the River and determined that such a setback would result in unacceptable land use and other environmental impacts and would not be cost effective.

The District modified the project design at the Elks Lodge and in Reach 11A to include an open bypass channel rather than a box culvert in response to USFWS request. The District rejected the CDFG suggested alternative of a supported earth bypass channel in reaches 6 through 10A due to high costs and social impacts.

The District will continue to operate in-stream percolation ponds in accordance with the MOU with CDFG regarding the Districts groundwater recharge program.

City of San Jose Participation

The District has held numerous meetings with various City departments and members of the City Council as well as the San Jose Water Company. Issues discussed included bridge replacement, roadway widening, relocation of utilities, storm drainage, flood control facilities, erosion repair and coordination with the Guadalupe River Park South Master Plan. City staff have attended field trips and reviewed and commented on project plans.

Public Information Meetings

Numerous public information meetings have been held in various reaches along the river to identify issues of public concern. Initial meetings were held on 13, 17, and 29 March 1989. Map review meetings were held on 2, 4, and 9 December 1991. A meeting was held in May 1995 to discuss recent flooding. In addition to these public meetings, several project updates have been mailed to residents and businesses in the project area throughout the life of the project. Public participation opportunities provided by the District are summarized in Table 9.1.

TABLE 9.1

PUBLIC MEETINGS AND OTHER COMMUNITY OUTREACH

Date	Type of Public Participation	Number of People Attended	Issues	Results
March 1989	Public Meeting	80	Presented flooding problems, possible solutions, and preferred alternatives.	Modified the preferred project between Capitol Exwy and Branham Ln., to widen both banks.
January 1990	Project Update Mailout	N/A	Brief update of the status of the project.	
April 1990	Relocation Meeting	30	Presented District's voluntary land acquisition and relocation program.	The program has been working well for the District and property owners.
May 1991	Project Update Mailout	N/A	Brief update of the status of the project.	
November 1991	Map Review Session	100	Presented engineering drawings for public review.	Design was revised to include planting on gabions. Coordination with the City's park department so the plan will complement the trail master plan.
July 1993	Project Mailout	N/A	Status report to owners of property to be acquired.	
February 1994	Project Update Mailout	N/A	Brief update of the status of the project.	
May 1995	Public Meeting	100	Discussion of the early 1995 flooding and review and comments on current engineering drawings.	Concerns about the project schedule and the need for flood protection for next winter's storms. Some expressed concern about environmental impacts and the river trail master plan.

Opportunities to Comment on the Draft EIR/EIS

A public hearing will be held during the public review period to receive comments on this document. Written comments will be accepted until 21 February 1997.

9.3 AGENCIES AND INDIVIDUALS RECEIVING COPIES OF THE DRAFT EIR/EIS

The following pages contain the mailing list for the Draft EIR/EIS.

MAILING LIST FOR THE
DRAFT ENVIRONMENTAL IMPACT REPORT
GUADALUPE RIVER WATERSHED PLANNING PROJECT

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Regional Water Quality Control Board
2101 Webster Street
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Ms. Margaret Roper
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Mr. Carl Wilcox
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Mr. Dante Maragni
National Marine Fisheries Service
777 Sonoma Avenue, Room 325
Santa Rosa, CA 95404

Mr. Mike Monroe
United States Environmental Protection Agency
5 Hawthorne Street
San Francisco, CA 94105-3901

Mr. Mike Aceituno
Wetlands Branch Chief
United States Fish and Wildlife Service
2800 Cottage Way, Room E-1823
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Attention: Mr. Steve Shoenberg

Mr. Calvin Fong, Regulatory Branch
United States Army Corps of Engineers
San Francisco District
333 Market Street
San Francisco, CA 94105-2197
Attention: Mr. Bob Smith

State Lands Commission
1400 Howe Avenue
Sacramento, CA 95825-8202

Mr. Alan Solbert
Jones and Stokes Associates
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Ms. Robin Cort
Parsons Engineering-Science
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Attention: Ms. Sandia Potter

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City of San Jose
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CHAPTER 11

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11.1 REFERENCES

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CHAPTER 12

GLOSSARY

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A-weighted Sound Level (dBA). An A-weighted sound level, or dBA, is a sound level to which the A-weighted scale has been applied. The A-weighted scale approximates the frequency response of the human ear by weighting the frequency range of 1,000 to 5,000 hertz more heavily than other frequencies. (Unweighted sound levels are expressed in the unit "dB"). It is possible to measure A-weighted sound levels by use of an instrument with an "A" filter.

Acre-foot. A quantity of water that would cover one acre to a depth of one foot, equal to about 325,000 gallons of water.

Aesthetic. Design for the purpose of enhancing beauty. The science of beauty; appreciative of, responsive to, or zealous about the beautiful.

Alluvial. Pertaining to material or processes associated with transportation and/or subaerial deposition by concentrated running water.

Ambient. Any unconfined portion of the atmosphere (i.e., outside).

Amoring (hydrology). The application of various materials to protect stream banks from erosion.

Anadromous. A fish that migrates from salt water to spawn in fresh water, as salmon of the genera *Salmo* and *Oncorhynchus*.

Aquiclude. A body of rock that will absorb water slowly but will not transmit it fast enough to supply a well or spring.

Aquifer. A body of rock or formation that is sufficiently permeable to conduct groundwater and to yield economically significant quantities of water to wells and springs.

Aquitard. A saturated but poorly permeable stratum that retards but does not prevent the flow of water to or from an adjacent aquifer.

Artifact. Objects produced or shaped by human workmanship.

Attractive Nuisance.

Attainment Area. A defined geographic area that meets the ambient air quality standards for a specified pollutant.

B.P. Literally, "Before Present." The number of years prior to now; by convention, before A.D. 1950.

Background. That part of a scene that occurs behind the center of interest.

Bay Area Air Quality Management District (BAAQMD). The local agency charged with controlling air pollution and attaining air quality standards in the San Francisco Bay Area.

Bedrock. Solid rock underlying unconsolidated surface materials.

Biotechnical. The use of natural, organic materials (e.g., living trees and woody debris) in combination with inorganic (e.g., rock) or human-made materials (e.g., concrete) to create a hardscape surface that resists erosion while providing higher habitat value for living organisms than a surface made of human-made materials alone.

Buffer. A small neutral area designed to separate.

Bypass Channel. A channel usually built to divert part or all of streamflow out of its natural channel during high discharges.

California Air Resources Board (CARB). The state of California agency responsible for air pollution control. Responsibilities include: establishing state ambient air quality standards, setting allowable emission levels for motor vehicles in California, and oversight of local air quality management districts.

California Clean Air Act. Legislation enacted in 1988 mandating a planning process to attain state ambient air quality standards.

Canopy. The overhanging part of a tree which shades the ground; the uppermost spreading branchy layer of a forest.

Carbon Monoxide. A colorless, odorless, toxic gas produced by the incomplete combustion of carbon-containing substances. The gas is emitted in large quantities by in exhaust from gasoline-powered vehicles.

Cenozoic. Designating the geologic era which began 60 million years ago, after the Mesozoic Era, and includes the geological present; comprising the Tertiary, Quaternary, and Holocene Periods.

Channel. A natural or artificial waterway of perceptible extent that periodically or continuously contains moving water. It has a definite bed and banks which serve to confine the water.

Channelization. Straightening of a stream or the dredging of a new channel to which the stream is diverted.

Clean Air Act. Long standing federal legislation (last amended in 1990) that is the legal basis for the national clean air programs.

Color. A phenomenon resulting from reactions of light and matter, whereby light rays (radiations) are separated as to wavelengths, some being absorbed while others are reflected.

Complexity. The quality of being complex, composed of two or more parts; a whole made up of complicated or interrelated parts.

Confluence. The junction of two streams.

Contamination. The presence of a chemical compound in soil, water, or air at a concentration above regulatory agency guidelines or requirements.

Continuity. Uninterrupted connection, succession; the property characteristic of a continuous function.

Contrast. A distinct difference between two parts of the same color dimension, which may range from subtle to strong.

Cooperating Agency. Any Federal agency other than a lead agency which has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment. The selection and responsibilities of a cooperating agency are described in 1501.6. A State or local agency of similar qualifications or, when the effects are on a reservation, an Indian Tribe, may be agreement with the lead agency become a cooperating agency (NEPA).

Costanoan. A general term ascribed to the original native inhabitants of the Central California coast, derived from the Spanish, meaning "people of the coast."

Criteria Air Pollutants. Air pollutants for which the federal and state government have established ambient air quality standards to protect public health. Criteria pollutants include: ozone, carbon monoxide, sulfur dioxide, particulate matter (PM_{10}), nitrogen oxide, and lead.

Crown (botany). The upper branches of a tree.

Cubic Foot per Second (cfs). The rate of flow equivalent to one cubic foot, about 7-1/2 gallons, passing a point during one second (approximately 450 gallons/minute).

Cultural Resource. Prehistoric or historic remains exhibiting significance for understanding past lifeways.

Cumulative Impact. As used in CEQA, the total impact resulting from the accumulated impacts of individual projects or programs over time.

Day-Night Average Sound Level (L_{dn}). The L_{dn} represents the average noise levels over a 24-hour period (based on average energy content of the sound) with a 10 dB weighting applied to nighttime noise.

Decibel (dB). The decibel is the most commonly used unit to express sound level relative to a reference sound pressure of 20 micronewtons per square meter (the threshold of human hearing). Sound levels in decibels (dB) are calculated on a logarithmic basis. An increase of 10 dB is normally perceived as a doubling of noise.

Degrade/Degradation. To be reduced far below ordinary standards, characterized by degeneration of structure or function.

Dense. Marked by compactness or crowding together of parts.

Densification.

Design Flow. The magnitude of streamflow that is used in design of channel modifications and structures across channels.

Diversity (ecology). Variety of species of plants and animals that compose a biotic community or ecosystem; often expressed as total number of different species.

Early Period. In Central California archaeology, the period of time from approximately 5,000 to 3,000 years Before Present (B.P.).

Emission Factor. The amount of a specific pollutant emitted from a specified polluting source per unit quantity of material handled, processed, or burned.

Epicenter. The area on the surface of the earth directly above the focus or plane of origin of an earthquake.

Estuarine. Formed in an estuary or that part of a mouth or the lower portion of a river where it meets the sea.

Ethnographic. Information relating to a culture or ethnic group's societal makeup, including customs, dress, mythology, history, etc.

Exceedence. A monitored level of concentration of any air contaminant higher than national or state ambient air quality standards.

Exotic. A plant that has been introduced from other regions and is not native to the region to which it is introduced.

Extraction (of groundwater). Removal of groundwater by pumping or bailing.

Fauna. Animals, especially within a specific region or time.

Fire Cracked Rock (FCR). Rock that has been altered by exposure to heat, as in a fire, usually in archaeology for prehistoric cooking activities.

Floodplain. A wide, gentle sloping area subject to periodic flooding from flood flows.

Floodwall. A structure which provides erosion protection or controls stream flow direction; typically consisting of vertical concrete walls.

Floodwaters. Those flows of water that cannot be contained within the natural stream channel.

Flora. Plants, especially within a specific region or time.

Foliage. A cluster of leaves, flowers and branches; the aggregate of leaves of one or more plants.

Foreground. That part that lies in front of the center of interest.

Form (botany). The shape and structure of something; its external appearance.

Frame. To enclose or border, as in a frame.

Freeboard. Vertical distance between the top of an embankment adjoining a channel and the water level in the channel. It is a factor of safety designed into a project.

Freeform. Having an irregular, nonrectangular, or curvilinear form or outline.

Full (botany). A plant that is well branched and well foliaged; dense.

Gabion. A wire mesh rectangular basket filled with uniformly sized rocks.

Garden. A plant where plants are cultivated for pleasure or domestic use, arranged in an orderly or planned fashion.

GIS. A computer system that utilizes database and graphics (Geographic Information System).

Grade. A ground level or elevation.

Gradient (groundwater). The change in total head with a change in distance in a given direction. The direction is that which yields a maximum rate of decrease in head.

Grading. Modifications of ground surface by either cuts and/or fills.

Greenbelt. A continuous belt of parkways, parks or farmlands that encircles a community.

Gridline. A network of uniformly spaced horizontal and perpendicular lines; a road resembles such a network.

Groundstone. A stone artifact exhibiting grinding efforts such as manos, metates, and pestles.

Groundwater. Water found underground in porous rock strata and soil.

Groundwater Flow. The movement of water through openings in sediment and rock which occurs in the zone of saturation.

Groundwater Recharge. The natural process of infiltration and percolation of rainwater from land areas or streams through permeable soils into water-holding rocks which provide underground storage ("aquifers").

Habitat. Environment or locale inhabited by living organisms.

Hardline. The interface of vegetation and architectural elements.

Hardscape. Non-vegetative elements in the landscape (i.e., wooden things, concrete).

HEC-2. Hydrologic model developed by the Hydrologic Engineering Center branch of the U.S Army Corps of Engineers to evaluate flood hazards.

Herbaceous. Having little or no woody tissue, dying back each year.

Highlight. The lightest spot or area of a surface, caused by reflection.

Historic. A temporal designation generally ascribed to the period of European contact in the New World to 50 years prior to the present.

Hokan. One of the primary language groups of prehistoric California. Based on linguistic evidence, it is believed Hokan speakers were some of the original inhabitants of the state, prior to 3,000 years ago.

Human Scale. A place that fits the structure of our bodies.

Hunters and Gatherers. A name ascribed to groups of people practicing a prehistoric lifeway defined by its reliance on the hunting and collecting of wild food resources. Material culture is usually quite simple, with a reliance primarily on stone tools.

Hydraulic Containment. Prevention of groundwater movement beyond a specified boundary, usually by pumping or engineered barriers.

Hydrology. Referring to the physical behavior of water.

Igneous. Formed by volcanic action or heat.

Interface. To interact or coordinate harmoniously.

Intermittent Stream. A stream that flows only during the rainy season.

Invasive (botany). The spread of harmful aggressive plants.

Jurassic. Designating the second period of the Mesozoic Era. The Jurassic period began 160 million years ago and lasted 35 million years.

Late Period. In Central California archaeology, the period of time from approximately 1,000 years B.P. to contact with European explorers.

Land Form. The shape into which the land surface area is sculptured by natural forces or the configuration of the land.

Lateral Spread. A dominantly horizontal displacement of flat-lying alluvial material towards an open or "free" face, such as steep bank or stream channel.

L_{eq}. Energy equivalent sound level.

Lead Agency. The public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment (CEQA).

Levees. Earth embankments that are constructed to contain flood flows. In this project there are existing levees (part of the existing creek) and proposed levees (part of the proposed flood control project).

Level. The value of an acoustical quantity in decibels.

Level of Service (LOS). A qualitative description of an intersection's operation, ranging from LOS A, or free-flow conditions, to LOS F, or jammed conditions.

Line. A straight or curved geometric element that is generated by a moving point and that has extension only along the path of the point.

Linear. Characterized by an emphasis on line, especially a straight line.

Liquefaction. The transformation of loose water-saturated granular materials (such as sand or silt) from a solid into a liquid state; a result of increased pore pressure and reduced effective stress. A type of ground failure that can occur during an earthquake.

Lithic (archaeology). Made of stone.

Lowlights. Small area of shade or shadow on an object.

L_p. Sound pressure level.

Lush. Growing vigorously, with luxuriant foliate.

Mano. A formal groundstone hand tool used in processing and grinding foodstuffs.

Marsh. A water-saturated, poorly drained wetland area, periodically or permanently inundated to a depth of up to 6 feet, that supports an extensive cover of emergent, non-woody vegetation.

Maximum Credible Earthquake.

Meandering (hydrology). A winding or intricate course of stream.

Mesozoic. Designating the geologic era which began 195 million years ago, after the Paleozoic Era, and lasted 135 million years; comprising the Triassic, Jurassic and Cretaceous Periods.

Metamorphic (geology). Produced by changes in form and structure by the agencies of heat, pressure, and water, causing crystallization, condensation, lamination, etc.

Metate. A formal groundstone tool used in conjunction with a mano as a grinding surface in the processing of foodstuffs.

Microclimate. The climatic conditions of a relatively small area or habitat, such as the inside of a hollow log or the north side of a hill.

Micropascals.

Midden. A cultural deposit marking a former habitation site and containing such materials as discarded artifacts, bone and shell, food refuse, charcoal, ash, rock, human remains, structural remnants, and other cultural material.

Middleground. The middle distance; midway between foreground and background.

Middle Period. In Central California archaeology, the period of time from approximately 3,000 to 1,000 years B.P.

Miocene. Designating the third epoch of the Tertiary Period in the Cenozoic Era, characterized by the development of large mountain ranges.

Mosaic. Pieces of variously colored materials to form picture or patterns.

National Register of Historic Places (NRHP). The National Register of Historic Places was established in 1966 to recognize resources associated with the accomplishments of all peoples who have contributed to the country's history and heritage. Guidelines based upon integrity and significance of resource were designed to assist national and state entities in determining eligibility for nomination to the Register. Resources listed on the register are afforded legal protection from adverse impact to preserve the nation's cultural record.

Natural Form. General plant shape which develops when outside influences such as crowding, pruning, etc. are absent. 2. The complex and constantly changing curves in line and plane which are classified as restful forms of beauty of nature.

New Source Review. The process in which a new or modified source of air pollutants is analyzed and it is determined how the new emissions compare to limits set for new or existing sources than have been modified.

Nitrogen Oxide. Gases formed in great part from atmospheric nitrogen and oxygen when combustion takes place under conditions of high temperature and high pressure.

Non-artifactual. Cultural remains not produced or shaped by human workmanship. This includes unmodified bone, shell, charcoal, and plant remains.

Non-attainment Area. Defined geographic area that does not meet one or more of the ambient air quality standards.

Ohlone. A native American tribe or cultural group centered on the San Francisco Bay and extending south to the Monterey peninsula. The term is often used concomitantly wit *Costanoan.*

One Percent (1%) Flood. The flood that has a one percent chance of being equaled or exceeded in any one year. (See discussion in Hydrology Section of Chapter 4.)

Overstory. The layer of foliage in a forest canopy; the trees contributing to an overstory.

Ozone. A pungent, colorless, toxic gas that is the product of complex photochemical processes, usually in the presence of sunlight.

Paleo-Indians. The original human occupants of the New World. Arguably arriving approximately 10,000 to 15,000 years B.P. from Siberia.

Paleontological. Pertaining to the study of fossils and ancient life forms.

Paleozoic. Designating the geologic era which began 550 million years ago and lasted for 355 million years, comprising the Cambrian, Ordovician, Silurian, Devonian, Carboniferous, and Permian Periods.

Parkway. Street or highway established with a right-of-way and which has been planted with tree, shrubs, and/or flowers, or on which natural vegetation has been retained; or an elongated park often used to connect parks in a system and usually associated with a road or highway.

Particulate. A particle of solid or liquid matter; soot, dust, aerosols, fumes and mists.

Pascal (PA). A unit of measurement used to define the extent of the variation in pressure such as sound, noise and vibration. A PA is a newton per square meter (N/m^2), and is approximately one-one-hundred-thousandth of the normal atmospheric pressure.

Peak Hour. The "hour" with the highest traffic volume between 7:00 AM and 9:00 AM and between 4:00 PM and 6:00 PM at an intersection or on a street segment.

Perched. a) Either a losing stream or a insulated stream that is separated from the underlying ground water by a zone of aeration; b) a saturated layer (shallow groundwater) overlies a slowly permeable, unsaturated layer.

Percolation. The downward movement of water through the soil.

Permeability. The quality of the substrate that enables water to move downward through its profile.

Pestle. A club-shaped groundstone hand tool for grinding or mashing substances in a mortar. Often exhibiting battering on their use end, they are commonly made of sandstone or basalt.

Photochemical Process. The chemical changes brought about by the radiant energy of the sun acting upon various polluting substances.

Plane. A smooth, flat surface; level.

Pleistocene. Designating the first epoch of the Quaternary Period of the Cenozoic Era, characterized by the rise and recession of continental ice sheets and by the appearance of man.

PM_{10}. Fine particulate matter with an aerodynamic diameter equal to or less than 10 microns. Individual particles of this size are small enough to be inhaled into human lungs.

Pool. Deep, slow-water areas in a stream.

Prehistoric. Pertaining to the period of time prior to the advent of written records. In the New World archaeology, this includes the period of time from the initial occupation of the Americas to the period of European contact.

Projectile Point. Commonly referred to as an "arrow head," but actually any of a variety of stone implements used as spear , dart, or arrow points used in the hunting of wild game. Usually triangular in form, they commonly exhibit excellent workmanship including bifacial pressure flaking and designs which serve the archaeologist in determining the use and age of such an artifact.

Quaternary. Designating the geological period following the Tertiary in the Cenozoic Era, comprising the Pleistocene and Recent Epochs.

Radiocarbon (C-14). A chronological dating method where a sample of organic material is broken down to ascertain the age of the material. This is accomplished by counting the amount of radioactive Carbon-14 in the sample, which breaks down at a known rate. The majority of New World prehistory is dated o this technique.

RCB (Reinforced Box Culvert). A closed, rectangular culvert constructed of reinforced concrete.

Reach (hydrology). A subdivision of the river for convenience of study and reference.

Reactive Organic Gases. A group of chemical compounds that contain carbon and react rapidly in the atmosphere.

Recharge. Replenishment of groundwater.

Redd. Spawning nest (depression) constructed by female salmonid in channel bottom that contains clean, loose gravel of varying size according to species in water of a depth and velocity that varies by species.

Remediation. Cleanup of contamination in soil or groundwater, either by active or passive methods.

Remnant (archaeology). Still remaining, a small surviving group.

Repetition. Occurring again and again; the act of repeating or being repeated.

Revetment. A facing on the channel side of material, such as stone gabions, concrete, or riprap used for bank stabilization.

Riffles. A shallow stretch of water extending across a streambed and causing broken water.

Riparian. Situated on or pertaining to the bank of a river, stream, or other body of water. Used to refer to vegetation and wildlife living within and immediately adjacent to a river, stream, or lake.

Rip-rap. A layer of large, durable materials (usually rock) used to protect a stream bank from erosion.

Riverine. Of or pertaining to a river.

Rock Groin (or Rock Deflector). Rocks that are built into the channel to protect a portion of one bank, deflect the flow into bedrock or another structure, create scour, or create rearing habitat by causing a laterial scour pool.

Rock Lining. Also called riprap, this is a measure commonly used to protect against erosion of earth banks of creek bottoms. In this project most rock-lined areas would also be filled with soil and revegetated.

Roughness Coefficient. A number representing the frictional resistance of a surface to the flow of water; used in hydraulic computations.

Ruderal (botany). Native and interdicted plants that occur in disturbed habitats and waste places.

Run (hydrology). Relatively fast-flowing water in a stream with an unbroken surface.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff.

Salmonids. Belonging or pertaining to the sub order *Salmonoidea* to which the salmon family belongs.

Screening. A growth of trees, shrubs or plants that shelters, protects or hides; ornamental screen that shield from heat, drafts or from view.

Seismicity. Characteristics pertaining to earthquakes.

Sense-of Place. An understanding on familiarity of an environment: how we perceive an image and feel about a place.

Serpentine. A type of rock high in magnesium, often greenish in color and mottled.

Shaded Riverine Aquatic Cover (SRA). A nearshore aquatic habitat, at the interface between the river and adjacent riparian vegetation, consisting of over-water vegetation and in-stream woody cover.

Shadow. The absence of direct light on a surface.

Sheet Flooding. A flood exhibiting sheet flow, when a water course jumps its banks and spreads over the surrounding landscape in a uniform sheet of relatively constant depth.

Shoring.

Shrink-swell (soils). Refers to the capacity of a soil to increase its volume when wet and shrink when dry. The erratic movement from high shrink-swell soil (sometimes called expansive soils) can damage foundations, slabs, and pavements and other structures.

Slope. a) Face of an embankment or cut section; b) the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100.

Soil. a) A natural, three-dimensional body at the earth's surface that is capable of supporting plants; b) all earth material of any origin that overlies bedrock and may include decomposed bedrock that can be readily excavated by mechanical equipment.

Soil Densification. To increase the density of soil by reducing the number and size of soil voids by mechanical means.

Sound. The compression and rarefaction of the air.

Space. That which has length, breath, and height.

Spatial. Relating to, occupying, or having the character of space.

Special-status Species. Refers to plants or animals that are either legally protected under state and federal Endangered Species Acts (ESA) and other regulations, or are species that are considered sufficiently rare by a scientific community to qualify for such listing.

Spread. Diameter of a plant.

Standard (air quality). Health-based pollutant concentration limit that applies to ambient air.

Stream Bank. The portion of the channel cross section that restricts lateral movement of water at normal water levels. It often has a gradient steeper than 45 degrees and exhibits a distinct break in slope from the stream bottom.

Lower Bank. The periodically submerged portion of the channel cross section from the normal high water line to the water's edge during the summer flow period.

Upper Bank. The portion of the topographic cross section from the break in the general slope of the surrounding land to the normal high water line.

Stream Reach. A portion of a stream that is relatively homogeneous based on geomorphology, stream flow, geology, and sinuosity. It is also may be thought of as a series of short reaches with common morphology.

Subgrade. Soil prepared and compacted to support a structure or a pavement system.

Subsoil. Bed or stratum of soil that lies immediately below the surface soil.

Succession. Progressive replacement of organisms in an ecological sequence until the climax stage is attained.

Sulfur Oxides. Pungent, colorless gases formed by the combustion of sulfur containing fossil fuels, especially coal and oil.

Symmetry. Exactly similar part of components on opposite side of an axis, point, or plane.

Terrace. An essentially level and defined area, often raised and planted.

Tertiary. Designating the first period in the Cenozoic Era.

Texture (aesthetic resources). The visual or tactile surface characteristics and appearance of something.

Thamien. One of the primary language groups in the greater San Francisco Bay area, of which the Ohlone in the study area are a part. It is believed that Thamien speakers are relatively new to the area, displacing Hokan speakers in approximately A.D. 500.

Threshold of Significance. A limit above which project-related emissions would be considered significant.

Tree Canopy. An overstory provided by tree foliage.

Tree Crown. The outside diameter of a tree's branches.

Tribelet. The basic cultural and political grouping of the Ohlone Indians. Tribelets consisted of 100 to 250 individual sharing one or more permanent villages with smaller villages in close proximity. The diversity of dialects and languages between different tribelets is renown for its complexity.

Turbidity. Cloudy or hazy appearance in a naturally clear liquid caused by suspension of colloidal liquid droplets or fine solids.

Understory. The small trees, shrubs and other vegetation growing beneath the canopy of forest trees.

United States Environmental Protection Agency (EPA). The federal agency responsible for control of air and water pollution, toxic substances, solid waste, and cleanup or contaminated sites.

Upland. Ground above the lowlands along rivers or between hills.

Value. The lightness or darkness of a color or colorless area.

Vantage Point. The position or standpoint from which something is viewed or considered; point of view; a position given a strategic advantage, commanding perspective or comprehensive view.

Vascular Plants. Plants having containing ducts or vessels by which sap is conveyed through the plants.

Verticality. A perpendicular to the plane of the horizon; upright; at right angles to the plane.

Viewpoint. Point of view; standpoint. A position from which objects are viewed.

Visual. Relating to, or used in vision. Something that appeals to the sight.

Visual Field. The entire expanse of space visible at a given instant without moving the eyes.

Washington-Style Baffles. Short beams of redwood or steel construction placed at various angles to reduce water velocities and increase water depth in concrete box culverts to facilitate fish passage.

Watershed. The geographical region or area drained by a stream. Also referred to as a basin.

Weir. A dam (usually small) in a stream to raise the water level or divert its flow.

Wetland. An area subject to periodic inundation or saturation, usually with soil and vegetative characteristics that separate if from adjoining non-inundated or saturated areas.

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